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A TREATISE  
ON  
DIET AND REGIMEN;

INTENDED AS  
A TEXT-BOOK FOR THE INVALID AND THE  
DYSPEPTIC.

BY  
W. H. ROBERTSON, M.D.

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Contents.

INTRODUCTION.	PHYSIOLOGICAL EFFECTS OF
DIET.	WATER.
VENTILATION, CLIMATE, AND	MINERAL WATERS.
CHANGE OF AIR.	SLEEP.
BODILY EXERCISE.	EFFECTS OF MENTAL CULTURE
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WITH A TABULAR ANALYSIS OF THE PRINCIPAL  
MINERAL WATERS.

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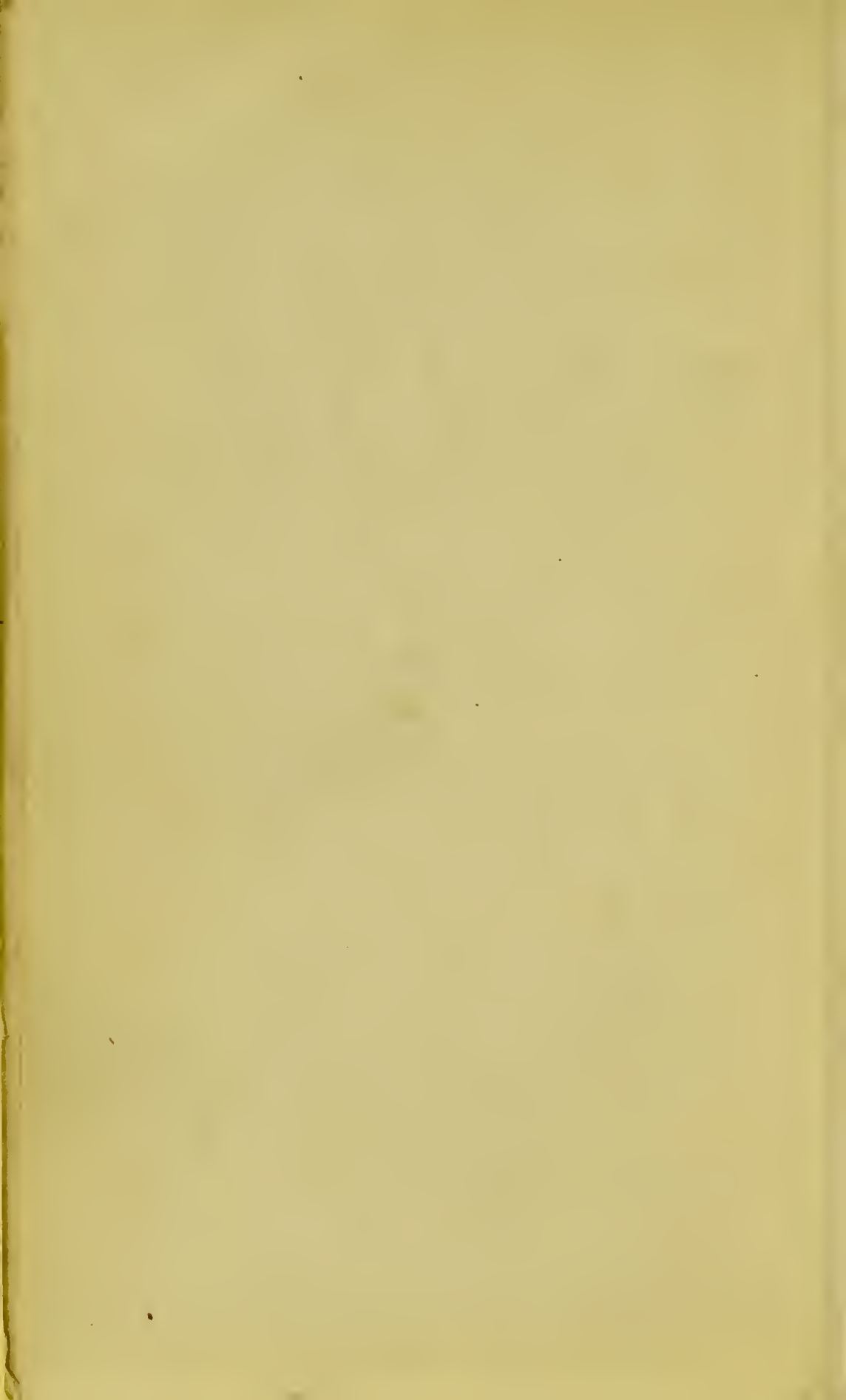
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'Nullius addictus jurare in verba magistri,  
— hic erit mihi magnus Apollo.'

*Constitutional Magazine.*

BUXTON  
AND ITS WATERS.





BUXTON  
AND ITS WATERS:

AN

ANALYTICAL ACCOUNT OF THEIR MEDICINAL PROPERTIES,  
AND GENERAL EFFECTS.

BY

WILLIAM HENRY ROBERTSON, M.D.

PHYSICIAN TO THE BUXTON BATH CHARITY.

LONDON:  
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AND W. MOORE, BUXTON.

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BRADBURY AND EVANS,  
PRINTERS EXTRAORDINARY TO THE QUEEN,  
WHITEFRIARS.



TO HIS GRACE  
THE DUKE OF DEVONSHIRE, K.G.

ETC. ETC. ETC.

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MY LORD DUKE,

I venture to avail myself of your permission to dedicate this treatise on Buxton and Buxton Waters to your Grace.

Buxton is indebted to the representatives of so many generations of your Grace's family for a large proportion of its advantages, that its prosperity cannot fail, if from hereditary attachment alone, to be connected with your warmest wishes; and the continued proofs that your liberality affords of the untiring interest you take in its welfare encourages me to hope, that you will regard with favour any effort, however humble, to extend the knowledge of the medicinal virtues of its waters, and to render them more widely useful in relieving human suffering.

I have the honour to be,

My Lord Duke,

Your Grace's obliged and faithful servant,

WILLIAM HENRY ROBERTSON.



## PREFACE.

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THE following work is by no means so complete as I could have wished it to be, or as I hope it may one day become. Its publication might, indeed, have been delayed until the deficiencies alluded to had been supplied ; but it is important that an account of the medicinal effects of these waters be laid before the public. Every week's observation shows it to be necessary that people should be informed of the effects of these waters, of the power they possess as a remedial agent, of the danger of using them injudiciously ; and the following account claims to be correct in its prin-

cipal outlines, although it is inadequately filled up in many of its parts.

Observations which might have been accumulating for years—which might have filled up all the outlines referred to—which might have rendered Buxton, in point of usefulness and consequent importance, second to no watering-place in the kingdom, and perhaps to no watering-place in the world, have been lost ; facts, which only many years of observation can supply, have been left unrecorded ; and, with the exception of a very few remarks on the general effects of these waters, their powers as a medicinal agent have never been taken notice of. They have been carefully analysed, and this had been done very many years ago ; and the more recent analysis has done little more than confirm that of Dr. Pearson. They have been used medicinally from a period long antecedent to any authentic record,

and were probably known to be possessed of remarkable medicinal powers long before the invasion of the Romans into Britain. And yet, while every other mineral water has received almost an undue share of attention, the thermal springs of Buxton are only known in the immediate vicinity to be good for rheumatism, and their usefulness is not known as far as the borders of the county in which they are situated ; and even medical men are quite unaware of the degree of their medicinal powers. When it is added, that this ignorance of their powers leads many to leave them untried, whose cases nothing else, unless it be time, can relieve, and that many of those who do make trial of them, use them, on this account, in a state of system by no means such as to give them the best chance of doing good, or in a state of system in which they cannot but do harm, there appears to be sufficiently

strong reason for introducing this work, even in its present crude state, to public attention. I trust to be able hereafter to complete the plan of this work in a way more satisfactory to myself. In the meanwhile, I commit it with all its faults to the public, and venture to hope that the circumstances just mentioned will deprive what blame it may deserve of much of its severity.

W. H. R.

*The Square, Buxton,*  
1838.



A Medical Account  
OF  
BUXTON AND BUXTON WATERS.

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CHAPTER I.

“ In these natural and laudable pursuits, two errors are particularly to be avoided : the first, not to confound those things of which we are ignorant with those we know, or rashly yield our assent without due investigation ; the second, not to bestow too much labour and study on obscure, intricate, and unprofitable subjects.”

CICERO DE OFFICIIS.

ACCORDING to the statement of Messrs. Lysons, in their admirable History of Derbyshire, the word Buxton was at one time (temp. Hen. III.) written *Bawkestan*es ; and it is added, “ it seems probable that it was originally written *Badestan*es, deriving the name from its stone baths.”

The great antiquity of Buxton as a bathing-place is put beyond all reasonable doubt, by the following passages from Dr. Pearson’s work on these waters\*.

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\* “ Observations and Experiments for investigating the Chymical History of the Tepid Springs of Buxton,” &c. &c. London. 1784.

“ Ruins, remains, and vestiges of art, which were allowed to be of Roman workmanship, that have been discovered at different times in the neighbourhood, and adjoining these celebrated waters, are the records from which it is collected, that the Romans made use of the tepid waters of Buxton as baths. Independently of these testimonies, it is extremely improbable that for the space of near five centuries, during which period England was provinciated to a nation with whom warm bathing was the most usual luxury, the celebrated fountains of Buxton should not be employed; the heat of which, although most probably not so great as that of their artificial baths, was capable of producing agreeable sensations upon immersion, and to the employment of which they would be farther invited by the crystalline appearance, want of colour, taste, and smell of the water.

“ Although we have no records to show that these waters were employed for the purpose of health or pleasure previously to the conquest of part of Britain by the Romans, or for ten or eleven centuries after it was abandoned by that people; yet we are not to conclude that they were not made use of on both these accounts. Such were the state of the arts, and the occupations of mankind, in those ages, that we can scarcely expect

any relation of the effects of these springs, had they been in request."

It is of little importance, in a work chiefly intended to supply an account of the medicinal properties of these waters, that it should be determined whether this evidence should be considered to be satisfactory or not. But when it is mentioned that the evident remains of a Roman road are distinctly observable within a very short distance of Buxton, that this road retains the name of *Batham Gate*\*, and that the name of the road was most likely assigned to it at the time it was made; that the remains of an old bath, discovered in 1781, exhibited sufficient marks of having been constructed many centuries ago; and that the Buxton waters possess a sufficiently elevated temperature, and are poured out in such large quantities, as to attract observation in any age;—there will perhaps be few doubts entertained, that the Buxton waters were used medicinally at a very early age, and may have been used as medicinal baths as early as the days of the Cæsars.

However doubtful some may be inclined to

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\* Several ancient roads concentrate at this spot, particularly one called the Bath-way, or Batham-gate, which commences at Brough, a Roman station near Hope, and was traced by the late Mr. Pegge; and another that came from Manchester, and is known in different parts of its course by the appellation of High Street, Street Fields, Street Lane, Old Gate, &c."—REES' CYCLOPÆDIA.

think the evidence adduced in favour of the opinion, that these waters were used in the earlier ages, it is certain they had attained considerable celebrity in the reign of Elizabeth, that the accommodations the place afforded were no longer sufficient to meet the wants of its visitors, and that the Hall, then erected by the Earl of Shrewsbury, was visited by some of the principal persons of the age. The unfortunate Mary, Queen of Scots, appears to have visited Buxton four different times, while in the custody of the Earl of Shrewsbury, in the years 1573, 1576, 1580, and 1582. For a quaint account of the circumstances leading to and connected with these visits, see Lodge's *Illustrations of British History*. From the same authority we learn that these waters were used medicinally by the two greatest men of those times—the Earl of Leicester and Lord Burleigh.

Before the Reformation, the medicinal virtues of these waters had been attributed to the good offices of their patron saint, St. Anne; and the walls of a chapel, consecrated to the saint, were decorated with the crutches which were no longer required by the cripples the Buxton baths had cured\*. In the earlier years of the Common-

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\* “ *Hæc resoluta senum confirmat membra trementum,  
Et refovet nervos lotrix hæc lympa gelatos.*



wealth, Buxton appears to have suffered from the superstitious errors of its earlier patrons. Conceived to keep up the Romish doctrines of saintly interference in human affairs, these interesting memorials of gratitude for health restored were destroyed ; and so bigoted had the national feeling become against everything connected with the unpopular creed, that the waters were, for a short time, prevented from being used by public authority. It may very fairly be inferred, that nothing but the real efficacy of these waters in the cure of disease could ever thereafter have restored them to any degree of reputation.

Yet the reputation of these waters would appear to have been little influenced by these circumstances. The cures they had effected could not be disproved ; and, as they were no longer to be considered as attributable to saintly influence, they began to be ascribed to the properties of the waters themselves. The Hall would appear to have been well frequented ; and it is said “ to have been at that time reckoned a fine mansion.”

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Huc infirma regunt baculis vestigia claudi,  
Ingrati referunt baculis vestigia spretis.”

HOBBS—*De Mirabilibus Pecci*, 1678.

Which has been thus rendered into English :—

“ This cures the palsied members of the old,  
And cherishes the nerves grown stiff and cold.  
Crutches the lame unto its brink convey,  
Returning, the ingrates throw them away.”

“ About 1670, this building was destroyed, and a new edifice erected by William, the third Earl of Devonshire. This mansion, with, probably, various alterations and additions, is the principal hotel at Buxton, now called *The Hall*.”

Thus wrote Dr. Pearson, about the year 1784 ; a year or two before which time, the foundations of a noble pile of building had been laid, called, from its form, *The Crescent*.

Under disadvantages to which, perhaps, no watering-place had ever been exposed, had Buxton hitherto been struggling. Situated in the midst of a wild extensive waste of moorland ; with hardly a tree within miles of it, unless at the bottom of a few scattered valleys ; the land uncultivated ; the country unsheltered from the winds ; a more dreary and inhospitable-looking spot than Buxton must have appeared in those days, cannot well be imagined. Yet, tempted by the well-earned reputation of its waters, people had ventured into this region of barren wildness ; and such were the benefits they derived, that, without having a single one of the usual watering-place attractions to offer to its visitors, the place maintained its celebrity.

But a wizard's hand was now to be stretched over this wild scene, and cover, as far as practicable, its land with verdure and its rocks with foliage. Between thirty and forty years have

served to do more than human imagination could have dreamed of as being possible ; and, while the scenery of such a country of hills and dales must always be wild, the wildness is in a great degree robbed of its sense of bleak desolation, and, even already, the country immediately around Buxton must be characterised as beautiful.

That Buxton, under the disadvantageous circumstances I have mentioned, should have been yearly resorted to by thousands of invalids, may be justly advanced as one of the strongest proofs that could be given of the power of its waters in relieving and curing disease.

## CHAPTER II.

“ But here I feel amends,  
The breath of heaven fresh blowing, pure and sweet.”

MILTON'S SAMSON AGONISTES.

“ Neque mediocris in morbis vetustis est vis, neque mediocris utilitas, idonei aëris, qui profecto in quibusdam morbis sola spes atque præsidium est. Ille autem debet esse purus, quod nullo modo obtineri potest nisi subinde renovetur. Plerumque siccus aër saluberrimus est; nimirum qui corpus maximè roborat et excitat, et exhalationem per cutem promovet, et cibi appetitum conciliat, et concoctioni favet, et respirationi fere accomodatissimus est.”

CONSPECTUS MEDICINÆ, A DOCTORE GREGORY.

“ BUXTON is situated on the western side of the north part of the county of Derby, in a tract of elevated, uneven, and hilly *moorland*, called therefore the *High Peake*, or the *Peake Hundred*.

“ The *Peake* is about fourteen or sixteen miles broad from the south-west to the north-east side; its whole length from the north-west to the south-east may be twenty miles, and it is supposed to contain one-fourth part of the whole county, or 170,000 acres.

“ This region of high land is the southern extremity of the ridge or chain of mountains and hills that extends from the Cheviot hills in Scotland nearly through the middle of the island, and terminates in the north part of Derbyshire. As



this range of eminent land runs through the middle of the north of England, as the Apennine does through Italy, it has been called *the English Apennine*.

“The British Apennine may be reckoned, for the sake of forming a general conception of it, from fifteen to twenty miles broad. Near Scotland it is much broader, and as the island to the north of Derbyshire contracts itself considerably in breadth, this tract of high land bears no small proportion to the breadth of the north part of England.

“The whole length of this ridge of land appears to be about a hundred and forty miles \*.”

Buxton is surrounded by hills, the majority of which are formed of the secondary or mountain limestone; on the north-western margin of a large formation of which the town is situated. The well-known characters commonly possessed by rocks of this formation,—their abrupt and precipitous cragginess,—the almost perpendicular clefts by which rock is often divided from rock,—the caverns which abound in its interior—are all singularly remarkable in this particular formation, and add greatly to the scenic grandeur by which Buxton is immediately surrounded. A stratum of the earth's crust ascertained to be older than the

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\* Dr. Pearson.

coal-formation, the mountain limestone must have been upheaved to the surface by some gigantic and primeval volcanic convulsion; and in that great intestinal struggle, there can be little doubt, were these fissures caused, through which the thermal waters escape to the surface, and give to Buxton its existence and its celebrity. This formation contains the earlier vestiges of organization. It is rich in the remains of the classes of animals that are conceived to have been the first denizens of our earth. It contains those marbles, for which the county of Derby has long been famous; two varieties of which owe their peculiar appearance to the abundant remains of shells, &c., contained in their substance, and which variegate so singularly their polished surface\*.

To the mountain limestone this extensive dis-

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\* It is interesting to look somewhat more closely than is generally done into the rocks about Buxton. In many places they are so evidently composed wholly of shells, as to make it no difficult matter to conceive that probably the whole of this extensive limestone formation is the accumulated result of animal organization,—as to prove that this country, now so much elevated above the level of the sea, was at one time covered by it,—and that it must, at some far remote time, have been upheaved from its depths by some violent convulsion, and raised to its present height above the level of those waters, in the depths of which its rocks were so singularly and wonderfully formed.

“ ——— Vidi factas ex æquore terras;  
Et procul a pelago conchæ jacuere marinæ.”

OVID. METAM.

trict owes its picturesque features, and the visitors of Buxton are indebted to this formation for most of the scenic attractions in its vicinity. Poole's Hole, within half a mile of Buxton; the Peak Cavern at Castleton; the beautiful rocks by which the river Wye runs, and the dales through which it passes, in its course from Axe-Edge, a few miles to the west of Buxton, till it joins the Derwent beyond Bakewell, and in its course thence to Matlock, are only so many of the features of the mountain limestone formation. An enumeration of these features includes a large proportion of the beauties of Derbyshire. I have mentioned Castleton, and may add Cow-dale, through which one of the roads from Buxton passes,—Chee-tor, and the dale of which this rock forms one of the sides,—Millar's Dale,—Monsal Dale,—and the romantic beauty of Matlock itself,—all owe their existence to this, decidedly the most picturesque of the geological formations that map the surface of the earth\*.

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\* The scenery of the Peak of Derbyshire and the adjacent country, together with certain mansions, which for several reasons are well worth seeing, supply a very pleasing and profitable mode of occupying their leisure time to such of the Buxton visitors as are blessed with adequate powers of locomotion. Chatsworth House, the princely seat of the Duke of Devonshire, which has been aptly called "The Palace of the Peak,"—Haddon Hall, a dilapidated but beautiful ruin, once the residence of "The Vernon,"—Alton Towers, the mansion

Did this comprise the whole of the debt which Buxton owes to the formation on which it immediately rests, we should be justified in attaching to it considerable value. But it is fitting that some other points, in which it is of more immediate advantage, should be taken notice of in a medical treatise on the locality and the waters of Buxton. The inhabitants of those districts of which limestone forms the superficial crust, enjoy a singular degree of freedom from many of the epidemic and endemic complaints, to which the inhabitants of adjoining districts are found to be liable. Unless in peculiar situations, and from the immediate contiguity of stagnant waters, which are a fertile and fearful source of disease to all in their vicinity, fever may be said to be unknown throughout this extensive formation; and I have not been able to ascertain that an accredited case

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of the Earl of Shrewsbury, with its unequalled gardens,—Beresford Hall, and its immediate neighbourhood, connected intimately with the memory of the venerable Izaak Walton,—Lyme Hall, the ancient seat of the time-ennobled family of Lee, full of interesting remains of the past, which carry the mind back hundreds of years, and almost enable it to picture to itself the lives and doings of perhaps not less than fifteen generations,—these are so many items in the list of things worth seeing in the neighbourhood of Buxton. Add to these the wonders and natural beauties of hills and dales, and ravines, and stupendous caverns, Dovedale, the vale of the Ghoit, and a long string of little less celebrated *et-cætera*, and it will be admitted that no watering-place can be more happy than Buxton in its vicinage.



of fever of the malignant type has ever occurred in Buxton or its immediate neighbourhood. The cholera, that fearful scourge, which so recently visited the adjoining districts, was utterly unknown in or near Buxton. My inquiries lead me to think that not a single case of cholera occurred in any part of this limestone formation. I have been told, that in Germany, during the prevalence of cholera, the physicians sent all, whose circumstances enabled them to follow the advice, to the limestone districts, with the promise, that in those districts they would be secure from its invasion. It would be interesting to ascertain how far this was applicable to our own country. It would, indeed, be a valuable addition to our means of arresting the progress of diseases, could we assign geological limits to their extension. Be these matters as they may, thus much may be said with justice. The town and neighbourhood of Buxton enjoys a singular degree of freedom from epidemic, and even more especially from endemic complaints. The influenza, which was so lately and so justly regarded as a more dreadful visitation than cholera, and which is said to have carried off a much larger proportion of our population than cholera had done, was in very few cases fatal in Buxton; and in those few cases, other previously existing complaints, especially the incurable complaint—

old age, appear to have been the real cause of death. Typhus and intermittents are unknown to its inhabitants. Consumption is comparatively rare; scrofulous affections comparatively infrequent; an extraordinary degree of uninterrupted health is the lot of the people; and I may venture to add, that an extraordinary number of them live to an advanced period of life.

The inhabitants of limestone districts have generally to use for all domestic purposes, the calcareous water which is the common product of the springs on this formation. It is, perhaps, questionable, how far this is really disadvantageous to those who have been accustomed to the use of calcareous water; but there is no question that such water is exceedingly apt to disagree with those who have not been accustomed to its use. If this applies to people who are in the possession of health, it is still more likely to apply to the invalided, whose systems are morbidly susceptible to every change. In these cases especially, such water is apt to prove unduly *stimulating*. But farther, cases might, *a priori*, be expected to occur, in which small doses of calcareous water, taken medicinally, might be useful, which cases would be over-dosed, and therefore injured, were it made the only procurable fluid vehicle of the alimentary supplies. This objection does not

apply to Buxton, whether it is visited for the purpose of breathing the pure dry air of the Peak, or of bathing in, or drinking, its calcareous waters. It has been said, that Buxton is situated almost on the border of the limestone formation. Within a very short distance of the town, in the line of the Manchester road, the gritstone formation is the superficial stratum; and from this formation, which yields the most pure spring water—the water most free from foreign ingredients—are the principal houses in Buxton supplied: giving its inhabitants and its visitors the threefold advantage of living on the limestone formation, drinking and using for all domestic purposes the water from the gritstone, and using medicinally, if it be required, the calcareous water.

The compound word *mountain-limestone* suggests another advantage possessed by the situation of Buxton. It is considerably elevated, its height above the level of the sea being more than a thousand feet. The only survey of the elevation of this district, the particulars of which I have been able to learn, was that made for the High Peak Railway. At the point where this railway passes nearest to Buxton, which may be at a distance of little more than a mile and a half, the elevation of the railway is  $1254\frac{1}{2}$  feet above the level of the sea. There is a gradual ascent from

Buxton to this point, of 225 feet ; which shows the exact elevation of the lower part of the town above the level of the sea to be  $1,029\frac{1}{2}$  feet. The mean density of the air is therefore materially less than it is in the generality of situations : so much so, that, according to Mr. Whitehurst, “ the column of quicksilver in the barometer-tube is always an inch lower at Buxton than at Derby, at the same time and under similar circumstances.” All mountain districts are physically subjected to showery weather ; yet, from its altitude, and from the absorbent nature of the superficial strata, the air of Buxton is singularly dry, and singularly free from fogs, or mists, or the lesser degrees of moisture. The surface of the country is dry within a very few hours after the cessation of the heaviest rains.

Buxton has had to contend against the reputation of being a very cold place. That this is in some degree true must be admitted ; but it should be known, that the essential dryness of the air greatly subtracts from the effect of the absolute lowness of its temperature. Dr. Kilgour says, that “ cold moist air, compared with cold dry air, abstracts caloric from the body in the ratio of 330 to 80 ;” or more than four times as rapidly. In other words, the chilling effect of moist air is four times greater than that of dry air ; and therefore



the absolute lowness of temperature at Buxton, compared with the temperature of less elevated districts, is often fully, if not more than compensated for, by the dryness of its atmosphere. But I apprehend that the mean temperature of Buxton has undergone a very considerable alteration within these few years: that its winters are milder, and its mean temperature higher.

There is always a look of coldness in a country, much of which has been enclosed in the life-time of the present generation, in respect to which the most absurd ideas were not very long ago entertained; in which it was thought to be a folly to plant hedge-rows, the notion being that they would not grow; which, till within the last forty years, had few trees near it; and the fields of which are even now, for the most part, divided by dry or unmortared stone walls. But we are warranted in believing, that these hills were once covered with luxuriant woods and almost endless forests. We know that within these thirty years, about two hundred and fifty acres have been covered with plantations, within the short distance of three miles around Buxton; that hedge-rows, unsurpassed by any in England, are now to be found skirting the town; that the plantations are, in every instance, thriving most luxuriantly, that many of them already form beautiful objects, and

even give a degree of richness to the landscape ; and we know how very materially plantations on so extensive a scale must contribute to shelter a country, and improve its climate. I think it may most justifiably be asserted, that Buxton no longer deserves much of the opprobrium on account of its coldness, which at one time it doubtless merited, that its climate must have been materially improved, and that this will go on improving every year, until, at no very distant time, it will have a climate equalled in mildness by few localities, if by any, that are placed at a similar elevation above the level of the sea ; while it will be well wooded, and well sheltered, and deserve the praise of being almost unequalled in the grandeur and magnificence of its mountain scenery.

It may be known to the reader that the oak seldom thrives on limestone, and that it barely lives on gritstone, unless it is capped, or covered, with a coating of clay. In the immediate neighbourhood of Buxton this tree is wanting ; but on the adjoining gritstone formation—and especially in the vale of Ghoit, where the gritstone is capped with clay—the luxuriance of this tree is great, and its rapidity of growth quite unsurpassed, and almost unequalled. The sycamore, the ash, the mountain ash, the broad-leaved elm, the larch,

and the Scotch fir, are the trees which are found to thrive best on the limestone around Buxton. It is not to be understood, however, that other trees will not grow in this locality. The birch, the lime, &c., will be found here ; but those mentioned above are the trees which are evidently best suited to the soil. It may be added, that the growth of trees, hedgerows, &c., is fully as rapid as it is in any other mountainous district.

The degree of shelter afforded by plantations, especially in mountain districts, is much greater than could have been conceived. If a mountain side be judiciously planted, the wind, which, but for the plantings, would be unchecked, and would course down almost to its base, is arrested by the trees, its direction is altered, and it is swept upwards again, leaving a considerable distance free from its influence. In this way, manure, and other dressings, are made to remain on the land, which would otherwise be blown off ; and not only is the land rendered more productive, but, as a consequence of this productiveness, the surface is better covered with verdure, and the country not only made to look richer and warmer, but to be more temperate. There is no doubt that verdure has the effect of adding to the mildness of the climate of the country it covers ; there is as little doubt, that affording to a country

shelter from the prevailing winds, by judiciously placed plantations, has very considerable influence in effecting the same most desirable intention: these, in their turn, re-act, and add to the value and productiveness of the soil. These causes are, at this very time, in full operation on the country around Buxton. The increased rate of productiveness has been proved to be most extraordinary.

It may be asked, what have the invalided visitors of Buxton to do with the productiveness of the country in its immediate neighbourhood, or with the effect of plantations upon that productiveness? The answer is simple. It is proved by these facts, that the climate of Buxton already deserves a better name than any writer has yet considered it to be entitled to, and that every year will render the injustice that has been done to it more and more glaring.

The amount of planting that has been mentioned refers to a distance of not more than three miles from Buxton; and this distance has been taken, because it is that which every one must feel to be influential on the appearance, and on the climate, of the town and its neighbourhood. But it might be maintained, that planting to any considerable extent could not be done within a much greater distance of the place, without



having its influence on the climate of the district. In one direction alone, between four and six miles from Buxton, one hundred and twenty acres have been planted within the last six years ; and, in the quarter referred to, the country is being planted at the rate of twenty acres every year. It is difficult for any imagination to conceive how beautiful this country will become in another half century, or how extensive and important an alteration will be effected in its climate, and in increasing the productiveness of its soil. But all has not been yet said on this subject, which, with reference to the climate of Buxton as a watering-place, will be admitted to be as important as it is interesting. Hundreds and thousands of acres in the neighbourhood of Buxton, unenclosed and bare of pasture thirty years ago, are now enclosed and productive.

The spring in Buxton is unusually late and proportionably short ; the summer of the average duration ; the autumn long. The spring cannot be said to have crept from the arms of winter till the month of April, and in general April is near its close before the winter can be said to be fairly got rid of. From the middle of May to the end of October, and at times till considerably later, and in fact almost to the end of the year, may be said to constitute the real spring, summer, and

autumn of Buxton. July and September are apt to be wet months here, as in most other parts of England. The latter end of May, the whole of June, of August, and of October, are usually the least changeable periods of the year.

The Buxton waters, whether used as baths or internally, are equally efficacious at all periods of the year\*; but people who have a choice generally prefer selecting the summer and autumnal months for migrating to watering-places, for the obvious reason that the country always looks best when nature has donned her livery, when the sun is bright and the weather warm; and that exercise, that great auxiliary to all medicinal measures in chronic cases, can be taken most pleasantly, and perhaps with most advantage. But why Buxton should not be as full of its invalided visitants in June and July, as it is in August and September, is one of those things which fashion and secondary circumstances have produced, but of which time and common sense must one day show the absurdity.

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\* "The usual season for drinking the waters is from the beginning of May to the latter end of October; but if the patient requires a longer perseverance, he may safely use them all the winter, as they are found, upon repeated trials, to be equally good in all seasons."—DR. HUNTER'S "*Buxton Manual, or Treatise on the Nature and Virtues of the Waters of Buxton.* York, 1765."

The comparatively cold evenings and mornings of autumn, and the greatly shortened days, render the exercise less continuous than is perhaps desirable, and make the disposal of his time irksome to many an invalid, whose indisposition has spoiled his taste for reading, and renders the excitement of much society necessarily disadvantageous. Were such a one to visit Buxton during the months of June or July, when the days are long, and dusk and bed-time are but little divided from one another, the mind's cheerfulness would be more likely to be maintained, and its operations rendered conducive to the medicinal effects of the water rather than suffered to interfere with them ; for no one need be told how great, and almost paramount, is the influence of the mind upon the body, and more especially when the latter is affected with disease.

I have used the expression *continuous* with reference to exercise ; and it may be well to embrace this opportunity of expressing my opinion of the importance of every one, and an invalid especially, taking his quantum of exercise in divided doses, at different times of the day, rather than endeavouring to do as much as he can at once, by which fatigue is induced, the blood determined almost unduly to the surface, the internal organs disturbed, and the nervous energies inconveniently

and injuriously expended. This deserves the serious consideration of the invalid, enfeebled by protracted indisposition, and with a system disposed to be acted on by causes the most trifling. On such a man's mind, the importance of not attempting to walk too far at once, but that he rather take a number of short walks alternated by rests, cannot be too strongly impressed. This kind of exercise, which may be taken within an hour or two after breakfast, and continued for a longer or shorter time, with longer or shorter intervals, almost till bed-time in the summer months, is that which will be found to be most useful to him, which will most fully employ his mind, and which will be most likely to prevent time from "hanging heavy on his hands;" while it will induce a more constant exposure to the genial and tonic influence of the air of Buxton, which, in a work on the medicinal advantages possessed by the place, deserves a higher degree of importance than has yet been assigned to it.

The dryness of this air is the probable cause of one singularly valuable property it possesses. Invalids hardly ever take cold at Buxton. They may have only just quitted the bed-room to which they have been confined by serious and protracted indisposition, have left the heated air of the sick-room, have travelled, smothered in great-coats, to



Buxton, and, almost immediately on their arrival, have ventured into the open air, have sat down on one of the benches with which the walks are plentifully supplied, and have spent hour after hour in this, which, in most places, under such circumstances, would be a dangerous indulgence. But, as has been said, it is here hardly ever followed by unpleasant consequences ; and, on the contrary, greatly contributes to the restoration of the lost vigour of the enfeebled system. When it is considered, that this remark is made with reference to a place resorted to for its tepid and hot baths, by the effects of which the vessels of the surface might be reasonably expected to be rendered unusually susceptible, its importance in a medical history of Buxton will be admitted to be great.

We know the extraordinary effect that change of air is capable of producing on the health of man, and that this is generally proportioned to the degree of change—provided it be not too great for the powers of the individual to endure without injury, and more especially if the change be from an air that is less pure to one that is more so, and from an air that is damp to one that is dry. There are indeed cases in which a removal to a damp air is advisable, and in which a low, well-sheltered situation should be preferred ; and there are cases

to which the most anomalous situations, such as the smoky air of a pottery, are found by experience to be the best suited. But these cases are to be regarded as exceptions to what holds good in the aggregate of human diseases. We can scarcely wonder, then, that the removal to such a locality as Buxton, should be attended with good effects in many diseases, from which its inhabitants are almost free, but from which the inhabitants of low, damp localities suffer so severely. It may very readily be admitted that a change of air of any kind often does good ; that there is a virtue in the air of a man's native place, which is perfectly inexplicable, unless we take into consideration the effect that the scenes of a man's younger days will have on his mind, and through his mind on his body.

“ ——— Custom moulds  
To every clime the soft Promethean clay :  
And he who first the fogs of Essex breath'd,  
(So kind is native air) may in the fens  
Of Essex from inveterate ills revive,  
At pure Montpelier or Bermuda caught.”

ARMSTRONG.

But, waving a consideration of the secondary influence of mind, and of special cases which are exceptions to every general rule, and of cases in which disease has so nearly done its worst, that

exposure to the ordinary breath of heaven could hardly be undergone with impunity, and to which the mildest and blandest air can alone be suitable ; it is not saying too much to affirm, that the air and locality, in which the inhabitants are most free from disease, is that which will be most useful to the generality of invalids, and that Buxton may lay claim to be ranked among the places which are entitled to this character.

## CHAPTER III.

“ The words I utter  
 Let none think flattery, for they'll find them truth.”  
 SHAKSPEARE. KING HENRY VIII. Act v. Scene 3.

THE town of Buxton is surrounded on all sides by hills. The remark applies in an especial manner to the lower part of the town, but it is applicable to the whole of it. Buxton lies in a valley. On the south-west side, on which it is the most directly exposed—the hills being at a distance of about a mile from the town—much pains have been taken to afford the greatest possible amount of shelter, by judiciously placed and very extensive plantations. It is scarcely possible to estimate the extraordinary degree to which they have answered this intention; while acres of young plantations, as every year adds to their height, will increase the effect, and more and more direct the currents of wind upwards, causing them to pass over Buxton, without being felt by it. With regard to the principal building in Buxton, *the Crescent*—and the remark applies almost in an equal degree to the whole of what is called “ Lower



Buxton"—it is so protected by the rising ground before it, by the rising ground behind it, by the plantations on one side of it, and the hills on the other, as to compensate amply to the invalided for what may be regretted by others in the situation of so beautiful a structure—a situation in which its architectural beauties can only be seen under very great disadvantages.

Although this work is by no means intended to be a "Guide to Buxton," and by no means aims at superseding those which are already before the public, it may not be foreign to its purpose to say, that the accommodations it affords to its visitors are second to no watering-place in the kingdom. The Crescent, built by the late Duke of Devonshire, and first occupied about fifty years ago, chiefly consists of two hotels, which can afford accommodation to more than two hundred persons, exclusive of servants. Contiguous to the Crescent is the Square—a pile of buildings erected somewhat more than thirty years since; and the internal area of the Crescent, and the external area of the Square, are skirted by a colonnade, which forms a covered walk of one hundred and seventy-five yards in length—rendering bad weather no excuse for neglected exercise in Buxton. The oldest building in Buxton, called The Hall, forms a third principal hotel; and the Grove, the George,

the Eagle, and the Shakspeare Inns are all equal, in point of accommodation and comfort, to any thing the most unreasonable could desire. A rising ground, immediately fronting the Crescent, answers the purpose of protecting it on the south, and is laid out in walks for the recreation of the visitors\*. A long space of ground, to the west of this stately pile of buildings, is planted with every attention to beauty and variety, and winding paths have been made through these plantations, which afford a sheltered and sufficiently secluded walk for those to whom these are objects, of such length as to try the powers of most invalids†.

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\* "The principal promenade of the invalids is upon the gravel walks in front of the colonnade, and as these extend one above another to the summit of the elevated ground, in proportion as the sick or lame person finds his strength increase, just in the same proportion does he advance higher up the hill; so that the patient who at first was barely able to hobble along the lower walk, marks every day the progress of his recovery till he is lost sight of in his diurnal ambulation altogether."

SIR G. HEAD'S HOME TOUR.

† Sylvan shade and retirement, when they can be procured, are agreeable appendages to a watering-place, and though there is a spot where both may be had at Buxton in great perfection, yet an individual may remain there some time without finding it out, merely on account of its being so immediately contiguous as to be mistaken for private property.

"It is a piece of woodland, so situated that lovers and doves may wander therein as if in a labyrinth, among purling streams and shady walks, and soo or whisper, side by side, protected by branches so luxuriant and leaves so thickly matted, that neither party, no matter how reasonably near, can disturb one another.

When it is added to this, that a part of every house in Buxton, with scarcely a dozen exceptions, is devoted to the reception of lodgers, there will remain no doubt on the part of the distant inquirer, that he may be accommodated to any degree his circumstances will permit, or his wishes could desire. The roads in the neighbourhood of Buxton are excellent; and it may be observed that the greatest care is taken in so timing their repair that they may be in the most perfect condition during the summer months. It deserves to be mentioned incidentally, that so much has the convenience of visitors been studied, that the toll-bars on the several lines of road have been, in almost every instance, removed to some distance from the town; so that, on one road, the drive or ride which may be taken free from toll extends, including the going and returning, to ten miles; on another to

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“The approach to this grove is by an entrance, as it were leading to a shrubbery, close to the inn, and separated only by a slight fence. Gravel walks lead in various directions, through a garden and lawn, diverging among large thriving trees, such as horse-chesnut, fir, birch, and sycamore. \* \* \* \* \* Following the course of the walks within the thicket, the scenery is that of a wilderness, but that here and there a rustic bridge is thrown across the stream that trickles at one’s side, and now and then one is invited to repose by commodious benches. \* \* \* \* \*

“It really would appear, while walking within this plantation, that one has wandered far within the recesses of a forest.”

SIR G. HEAD’S HOME TOUR.



four miles ; on another to five miles ; on another to about three miles.

With the Crescent, the Hall, and the Square, both the natural and the hot baths are connected by a covered pathway, rendering the passing from all these buildings to the baths entirely independent of changes of weather.

The *natural* baths, exclusive of those devoted to the use of the patients of the Buxton Bath Charity, are five in number, respectively called “The Ladies’ Public Bath,”—“The Ladies’ Private Bath,”—“The Gentlemen’s Public Bath,”—“The Gentlemen’s Large Private Bath,”—and “The Gentlemen’s Small Private Bath.”

Of these the oldest is the Gentlemen’s Public Bath. It is lined with smooth stone. Through interstitial crevices, purposely left between the stones which form the floor of this bath, the water enters from the spring itself. The water in this bath is four feet nine inches deep. The length of the bath is rather more than 25 feet, and it is about  $12\frac{1}{2}$  feet wide. The temperature of the water in the bath is within a small fraction of 82 degrees by Fahrenheit’s thermometer.

From this bath, at its south-western corner, a portion of the water, as it comes through the natural crevices of the limestone, is cut off and collected in a reservoir, from which three of the

other baths are supplied by pipes, which are laid with such jealous care, that the water only loses one degree of heat in its passage from the reservoir to any of the baths supplied from it.

The Gentlemen's small private bath is of an oval shape. The long diameter of it is  $13\frac{1}{2}$  feet, the short diameter 6 feet. The temperature of the water in this bath is within a fraction of  $81\frac{1}{2}$  degrees. The bath is lined with white porcelain.

The Gentlemen's large private bath is of an oblong square shape. Its length is 21 feet, its breadth more than  $10\frac{1}{2}$  feet. The bath is lined with white porcelain. The depth of the water in this bath, and in the Gentlemen's small private bath, is 4 feet 8 inches.

The Ladies' public bath is an oblong square. Its length is 21 feet, its breadth 12 feet. The depth of water in the bath is 4 feet 6 inches. It is lined with smooth stone.

The Ladies' private bath is 12 feet long, and  $4\frac{1}{2}$  feet wide. The depth of water is 4 feet 6 inches. It is lined with white porcelain.

All these baths are provided with forcing-pumps, by which the water may be directed against any affected part with very considerable force. Proper dressing-rooms, well aired, are attached to the several baths; towels, bathing-gowns, &c., are of course provided; servants are in constant attend-

ance to supply every requisite assistance ; screens and waterproof dresses are provided, to enable any part to be pumped upon without rendering it necessary to immerse the rest of the body ; a convenient machine is in readiness to lower the extremely infirm into the water ; and, in short, no means are left untried, to deprive the bathers of Buxton of what has been said to be necessary to Englishmen—a something of which to complain, and at which to grumble.

Water is constantly running into and out of the whole of these baths with such rapidity, that in about two hours and a half the largest of them is refilled\*. Lest even with this constant flow of water any impurities should be left, the baths are regularly emptied and thoroughly cleaned every night.

Up to the year 1818, there had been no means

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\* “ Some calculate that these springs throw out water at the rate of sixty gallons a minute. If we suppose two and a half times the quantity of water I found to be contained in the gentleman’s bath, to have flowed into the three baths in the two hours and fifty minutes I observed it required to fill one of these baths, then the whole quantity flowing from these springs in the above time was about 23,916 ale gallons, or about 8440 hourly, and nearly 140 ale gallons a minute.”

DR. PEARSON.

The Doctor says, that he may perhaps have over-estimated the rate at which water is poured out by these springs ; but he thinks that, at all events, he should be near the truth in considering that they pour out more than a hundred gallons of water every minute.

provided for giving the visitors a bath of higher temperature than the natural water. It is mentioned by Dr. Denman in the strongest terms, as a very decided disadvantage. But he could not to any adequate degree have foreseen the amount of good that has resulted from the judicious use of the artificially heated baths of Buxton. With effects in some cases very different from those produced by the natural baths, and in most cases with these effects very much modified, these baths render the use of the Buxton waters extremely advantageous in some cases, to which they would otherwise be inapplicable ; and they render bathing expedient in stages and modifications of disease, in which Buxton waters would otherwise be injurious.

The greatest possible care is taken to heat the water in such a way, that it may lose as little as possible of its gaseous or saline constituents. A cistern into which the water is conveyed from a collection of springs at an inconsiderable distance is enclosed within a larger cistern ; and between these steam is circulated freely, by which the water in the inner cistern is heated. The hot baths are four in number. They have convenient dressing-rooms attached to them. The apartments are always well aired, and the baths are lined with white marble.



It may be added, that an admirably constructed shower-bath is attached to these baths. For obvious reasons, it is comparatively little used.

The following sketch of what has been done, from time to time, for the accommodation of the drinkers of these waters is derived from the authorities cited by Dr. Pearson:—It appears that the oldest basin in which these waters were collected, so far as any account of it has been received, was of stone; and that immediately contiguous to it was a wall, cemented with “red Roman plaister,” and said to be the remains of the ancient bath—(Bishop Gibson’s edition of Camden’s *Britannia*). This wall and basin were removed in the year 1709; and Sir Thomas Delves of Cheshire, “in memory of a cure he received here,”—(Campbell’s *Political Survey of Great Britain*—Short’s *History of the Medicinal Waters of Buxton*,)—caused an arch to be erected over the water, “twelve feet long and twelve feet broad, set round with stone seats on the inside,”—(Short.)—“In the middle of this dome, the water sprung up in a stone basin, two feet square above.” This arch and well were, in their turn, demolished, to make way for the foundations of the Crescent. “The water had been hitherto conducted from small subterraneous streams of a tepid spring, for some distance, into this well; so that most probably the well anciently



was not exactly on the spot where Sir Thomas Delves's well was made. After the destruction of the well a second time, for the purpose just mentioned, the water was conveyed in a small gritstone channel, forty-six feet long, in a different direction, viz. about forty-six south-east, into a neat square basin of white marble, enclosed within a temple in the style of Grecian architecture, where it is drunk at this time, without having suffered any alteration in its properties, and with some superior advantages,"—(Dr. Pearson.) "The water," says Dr. Pearson, in another part of his able work, "was conveyed at least forty feet in a north-east direction to the OLD well; and it is now conducted forty-six feet distance, south-east, in a covered channel of gritstone, which is of a semi-cylindrical form, the stones composing which lie on their convex side. The diameter of the cylinder, of which this channel is nearly a semi-cylinder, is about four inches and a half. The basin of the new St. Anne's well is hewn out of an entire mass of gritstone, and it is covered with a massy stone of the same kind, placed in contact with the water, and cemented down. An aperture is made in the side of the basin, through which the water perpetually flows, as from a pump-spout, at the rate of half a pint in a second of time. A neat basin of white marble is placed under the stream

that flows through this aperture, for the convenience of filling glasses and other vessels with the water."

The temperature of the water in this basin is 77 degrees; and consequently it has lost five degrees of heat in its passage from the springs.

## CHAPTER IV.

“ In the very dry summer of 1780, when all the cold springs in this part of the country either totally ceased, or were much diminished, I was well informed on the spot, both at Matlock and Buxton, that the warm springs had suffered no observable decrease of their water. Whence, I conclude, that the sources of these warm springs are at a much greater depth beneath the surface of the earth than the cold ones.”

DR. DARWIN.

THE temperature of the Buxton waters is the first of their characteristics that I shall notice. It is the most important of their sensible qualities; for, although no one who had seen their medicinal effects could ascribe them solely to their temperature, yet their temperature must be admitted to have much to do in the production of those effects—in enabling their saline and gaseous constituents to act with energy on the system.

There are few subjects which have given rise to more ingenious speculation, than the cause of the elevated temperature of hot springs. The reader need hardly be told, that although there are only three localities in which such springs are found in England,—at least in which the water is of such elevated temperature as to have obtained for them much celebrity, they are by no means so rare on

the continent of Europe. About forty such springs have been found in Portugal alone ; the temperature of which ranges from 68 to 150 degrees. It seems highly probable, that, but for the unsettled state of that country, its hot-springs would have been extensively and satisfactorily investigated long ago. Between sixty and seventy such springs exist in France, the temperature of which is said to range from 70 to 212 degrees. Switzerland and Italy are likewise rich in this respect. But the springs of Germany have far outstripped all others in medical importance, which may not unfairly be ascribed in some degree to the personal efforts of the highly-gifted people of that favoured country. The baths of Aix-la-Chapelle, Wiesbaden, Ems, Baden, and several others, are now as well known by reputation to the medical men, and it may be said to the gouty and rheumatic, in this country, as to the Germans themselves.

Before directing the reader's attention to the causes which may produce the elevated temperature of hot-springs, it may be well to take some notice of a question which is intimately connected with it, and endeavour to show whence the water is derived with which these springs are supplied.

The water of all springs whatever must be derived from the atmosphere, or from large subterranean reservoirs, or from the ocean.



The water of many springs is derived from the atmosphere. The aerial vapours are condensed on the surface of the earth in the form of rain, hail, or snow. The water percolates through the softer strata ; finds its way through fissures, which the miners call *faults*, in the denser strata ; till its farther progress is stopped by an impermeable bed of clay, &c. It is forced over the surface of such a stratum by the pressure of the superincumbent water, until it is carried once again to the surface of the earth through a breach in the strata above it, and forms a spring. But miners say, that the lower they descend below the surface, the less water they meet with. Indeed, these waters can hardly be supposed to penetrate very far, without being absorbed by the strata through which they pass, or arrested by meeting with an impermeable stratum. Whereas we know, that boiling water has been poured out by volcanic agency, at the height of thirteen thousand feet above the level of the sea, and on the very confines of perpetual snow ; and consequently the depth at which large collections of water may be supposed to exist must be very considerable.

There seem, then, to be reasons for believing, that there are reservoirs, or large collections of water, situated at considerable depths in the bowels of the earth ; while it should be added,



that these collections of water cannot be so considerable as to be independent of supplies from other sources, and to be capable of pouring out the immense volumes of water which are discharged from depths to which the atmospheric waters cannot be supposed to penetrate, without a material decrease in their own quantity, and a material increase in the quantity of water contained in the atmosphere, and in the ocean. That these subterranean reservoirs cannot be of such extent as to afford this unlimited supply is, however, sufficiently proved by experiments and calculations, by which a specific gravity is assigned to the globe of very nearly five times the specific gravity of water, and a third more than the mean density of its rocky crust. This is quite incompatible with all idea of such immense subterranean reservoirs of water as would be necessary, were those waters which are poured out from the depths of the earth derived from such a source.

But when we take into account the amount of volcanic agency that is proved to be still going on; when we consider that the thermal waters spring, with few exceptions, in the neighbourhood of either recent or extinct volcanoes; when we couple with this the amount of volcanic power that is manifested in the ocean,—the islands that have been upheaved from its depths within the

memory and authenticated traditions of men,—the shocks that are often experienced far out at sea ; when we connect these facts with another singular fact, that thermal springs are very rarely found at any great distance from the sea ; and when to these it is added, that columns of watery vapour and showers of boiling water form the principal phenomena of active volcanoes ; it is surely not too much to connect intimately the waters of the ocean with thermal springs, and conceive that the ocean is a probable source from which the waters of these springs may be derived. Is it too much to conceive that through the disrupted strata, or *faults*, at the bottom of the ocean, through chasms created by volcanic outbreaks, water would be forced by the enormous pressure of the vast mass of waters above ; or that this should, under such pressure, and with the facilities created by the strata having been disrupted by the volcanoes, penetrate much deeper than we can conceive the atmospheric water to penetrate ? Is it too much to conceive that in this way water might arrive even at the centre of volcanic agency ; or that there, urged by the heat which exists in the depths of the earth, this water should be converted into steam ; or that, when the steam thus formed can find no vent, it should accumulate, and at length acquire such power as to upheave

the mass of strata above it, and in its turn constitute the active element of a volcano ; or that, when the steam can find a vent for itself, by passing through strata already disrupted, it should be gradually condensed and cooled, till it emerge at length on the surface of the earth, in the guise of a hot or a tepid spring, according to the length of the channel through which it has had to pass ?

This is certainly little more than theory ; but it is theory founded on an association of facts, which lead to the opinion that it is the probable explanation of these natural phenomena. If it be denied, it is difficult to assign any satisfactory reason why thermal springs are not found as commonly in the interior of vast continents, as in the neighbourhood of the ocean ; why thermal waters are so constantly found to be connected with existing or extinct volcanoes ; and why water in the form of steam, or at a much elevated temperature, is so constantly associated with every volcanic outbreak ? But this enables us to give an explanation of several circumstances which form singular and interesting matters in the history of thermal waters. It gives a key to the surprising fact that thermal springs flow in almost unvarying quantity, and at an almost unvarying temperature, from age to age, and that as

far as can be ascertained, their constituents have been but little modified by time. Did the waters with which these springs are supplied proceed from the same source as that of the generality of springs,—the waters condensed on the surface of the earth from the atmosphere, we should necessarily and naturally expect them to be subject to the same vicissitudes. In a particularly dry season, the supply would be diminished, or would temporarily cease; and on the other hand, after an unusually large fall of rain, the quantity discharged from them in a given time would be greatly increased. But, in the majority of thermal springs, these causes have no influence. In winter and in summer, in dry seasons and in wet seasons, a certain number of gallons per minute are poured out with almost undeviating regularity. Moreover, did they derive their water from the atmosphere, the colder the season, the lower should we be justified in expecting the temperature of these waters to be; and certainly the larger the quantity of water poured forth, the lower would its temperature necessarily be, and *vice versâ*. But in the majority of these springs, through a long series of years, not only does the quantity of water poured out by the spring in a given time remain the same, but its temperature remains steadily the same as it was at the earliest



period when that temperature was recorded. Admitting the ocean to be the source from which these springs derive their supply of water, there is no difficulty in conceiving a definite quantity to be forced downwards through fissures, by the pressure of the superincumbent water; or in supposing that definite quantity to be converted by the central heat of our planet into steam; or in supposing the steam to be condensed, and cooled to a given extent, by passing through a certain space, and consequently no difficulty in explaining how sixty gallons (or if Dr. Pearson is correct, a hundred gallons) of water, at the undeviating temperature of 82 degrees, come to be discharged every minute into the reservoir which supplies most of the Buxton baths.

To such as have not been accustomed to these investigations, the absence of salt in any of these springs might be considered to be fatal to the above views. But it has been sufficiently proved by direct experiment, that sea water is deprived of its saline constituents by passing through a certain thickness of sand, &c.; and, therefore, passing through we know not how many miles of various strata would necessarily deprive it of all its saline matters, even if the hypothesis of its conversion into steam, and consequent separation from every foreign ingredient, were thrown aside.



To what cause may the elevated temperature of thermal springs be ascribed? is a question of more immediate interest, and one which may be said to be pretty satisfactorily solved. It may be remarked *in limine*, that, knowing as we do the gigantic extent of all the processes of nature, and the uniformity of means used to effect the same results in different places and at different times, it may almost be inferred, that the same cause which produces the elevated temperature of any one of these springs might be applied with equal certainty to account for the elevated temperature of any of the others.

Thermal springs are always found in the greatest abundance in the neighbourhood of active or recently active volcanoes; and volcanoes are hardly ever found to exist without giving rise to springs of tepid water. In those situations where no traces of volcanic agency can be detected in the neighbourhood of tepid springs, these waters are always found to issue from the primary rocks, chiefly from granite, either directly, or from beds of inconsiderable thickness which evidently form a mere crust over rocks of the primary class.

Connecting these facts with one another, we are led to the conclusion that these springs, in all probability, arise from beneath the primary rocks, through natural faults in the strata, or

through the disruptions caused by volcanic agency. From the facts, that hot-springs are almost a necessary consequence of volcanoes, that the majority of them are among the effects of these dreadful phenomena, and that only in rare cases are hot-springs found where there are no vestiges of volcanoes, and that in these cases they are only found to spring from the primary rocks, we may, perhaps, venture to draw the conclusion, that hot-springs arise from beneath the primary strata—from strata beneath all those which have hitherto been the subjects of geological observation. It remains to be shown, that the temperature of the interior of the earth is adequate to raise the large quantities of water that are brought into successive contact with it, to the boiling temperature.

It has been observed in high latitudes, that when the atmospheric temperature falls below a certain point, the temperature of the springs in those districts ceases to fall in the same ratio; and, in fact, that their temperature often exceeds that of the air. Nor is this singular observation confined to the springs of those districts. It is well known, that a certain elevation of temperature is essential to the discharge of the functions of plants. Rye requires for its growth a temperature of not less than 46 degrees. Owing to the independent terrestrial temperature, it has grown

and ripened in Sweden, when the atmospheric temperature is little more than 36 degrees. A sufficient number of observations warrant us in coming to the extraordinary conclusion, that the mean terrestrial temperature exceeds the atmospheric in all northern countries ; and, in fact, that the globe has a certain amount of inherent heat, which prevents its surface from being reduced below a definite temperature. It is owing to this, that nearly the whole of Siberia, the upper parts of Finland, and some parts of Sweden, afford harvests and sustenance to the inhabitants, under a degree of atmospherical temperature which would be insufficient for these purposes, but for the inherent temperature of the earth. That this is not owing to the absorption of the solar heat during the warmer months, is proved by experiments which show, that six months are required for the absorption of heat to the comparatively trifling depth of thirty feet. This is proved still more conclusively by the ascertained fact, that the atmospherical temperature at the equator is higher than that of the perennial springs.

These observations alone would go far to establish the belief, that the earth possesses a considerable degree of internal heat, which might very reasonably be supposed to be more considerable, the greater the distance from the surface. But it is by the results of experiments which

have been made in mines, that it has been established as a fact, that the deeper we penetrate beneath the surface of the earth, the higher the temperature is, and that we are enabled to form some idea of the depth at which the earth is at so high a temperature, as would suffice for the conversion of water into steam.

In the ancient quarries below the Observatory of Paris, the temperature is nearly two degrees higher than that of the mean temperature of the country, at the depth of only 92 feet. If the temperature of subterranean springs be taken as a guide to indicate the increased temperature of the earth, as we penetrate more deeply below its surface, it has been found, among many other and corroborating observations in different localities, that in the copper mine of Dolcoath, in Cornwall, at the depth of 1440 feet, the temperature of the spring is 82 degrees, while the mean temperature of the country is only 50 degrees; that in the silver mine of Guanaxuato, in Mexico, at the depth of 1713 feet, the temperature of the springs is more than 98 degrees, and the mean temperature of the country little more than 60 degrees.

It is, however, chiefly by ascertaining the temperature of the rock itself, at different depths, that any fixed and definite conclusion can be arrived at, as to the rate of increase in the tem-



perature, as we descend further and further into the depths of the earth. These observations have hitherto been too few and too unsatisfactory to determine this question: but, on the whole, it has been thought that the earth becomes warmer by one degree for every 44 feet of depth, stating it in round numbers; and, consequently, at a depth of not more than a few thousands of feet below the surface of the earth, the temperature must be such as would raise water to the boiling heat, and convert it into steam\*. It may be admitted,

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\* The most recent and satisfactory experiments that have been made, with the view of ascertaining the temperature of the rock itself at different depths, were reported to the members of the British Association, at the meeting held in Bristol, in the year 1836. I am indebted to the admirably drawn up abstract of the proceedings of the Association, which is given in the *Athenæum*, for the following facts:—  
 “The results of these observations, so far as they had as yet proceeded, amply confirmed the fact of the increase of temperature in the parts under the earth’s surface. As one example, Professor Philips stated, that in a mine, the perpendicular depth of which, below the surface, was 525 yards, the thermometer in the rock stood at  $78^{\circ}$ , while the temperature in the open air at the mouth of the mine, varied from  $30^{\circ}$  to  $80^{\circ}$ , the mean temperature of the place being  $47\frac{1}{2}^{\circ}$ . Professor Forbes then gave, from memory, an account of the experiments which he had been the means of instituting in the Lead Hills.”

\* \* \* \* \* “These observations were particularly interesting, from the fact, that the mines, in consequence of a strike among the workmen, had not been worked for many months, and at the same time it most fortunately happened that they were self-drained, that is, by machinery worked by external power, without the aid of either animals or steam. This most fortunate concurrence of favourable circumstances, which could be expected to be met with in so very few in-



that the observations have not been made with sufficient accuracy, nor in a sufficient number of different situations, nor often enough repeated, to warrant an assertion, that at any given distance below the surface, the temperature of the earth must be such as to enable it to raise water to the temperature of 212 degrees ; but enough has been ascertained to justify the conclusion, that this would be the case at a depth of little more than seven thousand feet—a depth which, in comparison to the diameter of the globe, is most insignificant.

It must be admitted that this would be sufficient to account for the elevated temperature of thermal waters ; but the intimate connection that there is between these waters and active and extinct volcanoes, has led to the suggestion that these may have something more to do with the

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stances, at once disembarassed the observations from many sources of error, which, but for this, would have still left considerable doubts of the results being, partially, at least, affected by the heat generated by animals residing and working in the mines, as well as of artificial fires kept up for the purpose of ventilation or of originating power. It was upon these grounds that he perceived the importance of them, but had it not been for the valuable assistance afforded him by Mr. Irvine, who descended into the mine, and placed the thermometer and made the observations, he could scarcely have been as successful as the results already obtained warranted him in hoping he should be. These results, which, of course, had not as yet reached the degree of accuracy which he still looked for, lead to the conclusion that the temperature in that mine increased about 50° of Fahrenheit for a descent of 95 fathoms."

production of these waters, than merely forcing the passage by which they escape to the surface. Snow to the depth of two feet and a half remained unmelted on Vesuvius, after the eruption had lasted two days in the year 1822; and the observers were able to keep their naked hands on the margin of the lava stream without inconvenience, the centre of which was in a melted state. This proves how slowly heat passes through the volcanic products; and it has been urged, that there may, possibly, be masses of melted matters thus crusted over, of enormous size, situated at great depths in the bowels of the earth; and that these masses may have been kept at a highly elevated temperature, for a period long anterior to any of our records; and that currents of water, passing close to, or near, these masses, may have been vaporised by them, and may have formed hot-springs, the temperature of which would not undergo any sensible diminution for hundreds of years.

With satisfactory proof of the astounding fact, that at a few thousands of feet below the earth's surface—a depth that bears no greater proportion to the earth's diameter, than a few inches bear to a mile,—its strata are at a most extraordinary elevation of temperature, it seems unnecessary to indulge in what can be little else than conjecture as to any other cause for the heat of waters,

which are known to proceed from greater depths than geology has made us acquainted with ; and which, in all probability, proceed from depths at which no other cause than the temperature of the globe itself would be required to convert water into steam \*.

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\*“ The relation, indeed, of almost all springs impregnated copiously with mineral matter, to the sources of subterranean heat, seems placed beyond all reasonable doubt by modern research. Mineral waters, as they have been termed, are most abundant in regions of active volcanoes, or where earthquakes are most frequent and violent. Their temperature is often very high, and has been known to be permanently heightened or lowered by the shock of an earthquake. The volume of water also given out has been sometimes affected by the same cause. With the exception of silica, the minerals entering most abundantly into *thermal* waters do not seem to differ from those in cold springs. There is, moreover, a striking analogy between the earthy matters evolved in a gaseous state by volcanoes, and those wherewith springs in the same region are impregnated ; and when we proceed from the site of active to that of extinct volcanoes, we find the latter abounding in precisely the same kind of springs. Where thermal and mineral waters occur far from active or extinct volcanoes, some great internal derangement in the strata almost invariably marks the site to have been at some period, however remote, the theatre of violent earthquakes.”—LYELL'S GEOLOGY.

## CHAPTER V.

“And yet more med’cinal is it than that Moly,  
That Hermes once to wise Ulysses gave.”

MILTON’S COMUS.

As connected with volcanic agency, to which so much influence has been ascribed in the production of thermal springs, it is an interesting fact that the matters which are the direct production of volcanic outbreaks, are nearly the same as those which form the principal constituents of mineral waters in general, and more particularly of thermal springs. When we take the fact, that the ingredients of mineral waters are, for the most part, identically the same with the matters discharged from the bowels of the earth by volcanic eruptions, in connection with the intimate alliance that subsists between volcanoes and thermal springs, it is impossible to avoid regarding it as being strong evidence in favour of the dependence of mineral waters on volcanic agency. Muriatic acid; sulphur, in combination with oxygen or hydrogen; carbonic acid; nitrogen; the muriates of soda and of lime; sulphate of lime, and iron, are all the common products of volcanoes, and the ingredients most commonly found in mineral



waters. In this way thermal waters, and indeed all mineral waters, may be grouped into one great family, identical in origin, singularly alike in chemical constitution, and entirely independent of local causes as to temperature, quantity of water, and amount of saline and gaseous impregnation \*. Whereas the other kinds of springs, even although their saline ingredients may be similar to those contained in some of the mineral waters, are dependent on local influences, are affected by wet or by drought, and by variations in the local temperature; and their geological and geographical positions are materially different from those of the genuine mineral springs.

The analysis of the Buxton waters, which is given in Sir Charles Scudamore's work on mineral waters, is that which must be referred to, because it gives the most modern, and therefore the most correct statement of its chemical constitution. This analysis was superintended by the distinguished operative chemist Mr. Garden,

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\* "Calcareous springs, although most abundant in limestone districts, are by no means confined to them, but flow out indiscriminately from all rock formations. In central France, a district where the primary rocks are unusually destitute of limestone, springs copiously charged with carbonate of lime rise up through the granite and gneiss. Some of these are thermal, and probably derive their origin from the deep source of volcanic heat, once so active in that region. One of these springs, at the northern base of the hill upon which Clermont is built, issues from volcanic peperino, which rests on granite."—LYELL'S GEOLOGY.



whose pursuits would enable him to appreciate the effects of re-agents, and to guard against the fallacies which are so apt to lead astray in the more delicate manipulations of chemistry ; and which would be likely enough to mislead the medical man, whose life has necessarily been passed in a very different field of observation.

According to this analysis, the tepid waters of Buxton contain nearly 15 grains of solid matters, and more than 6 cubic inches of gaseous matters in the gallon. Of the solid contents, carbonate of lime constitutes more than two-thirds, muriate of soda nearly a fifth, and the remainder consists of mere fractional quantities of muriate of magnesia, sulphate of lime, and extractive matter.

To quote the results of the analysis in more precise terms, one gallon of the thermal waters of Buxton was found to contain,

OF GASEOUS CONTENTS,	CUBIC INCHES.
Carbonic Acid . . . . .	1-50
Nitrogen . . . . .	4-64
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	6-14
OF SOLID CONTENTS,	GRAINS.
Muriate of Magnesia . . . . .	-58
Muriate of Soda . . . . .	2-40
Sulphate of Lime . . . . .	-60
Carbonate of Lime . . . . .	10-40
Extractive matter, and a minute quantity of vegetable fibres . .	-50
(Loss) . . . . .	-52
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	15-00

It appears from this, that these waters contain scarcely 15 grains of solid matters in the gallon, and little more than 6 cubic inches of gases; and this approximates very nearly to the much earlier analysis of Dr. Pearson, who procured  $14\frac{3}{4}$  grains from a gallon. It must be admitted that these analyses are singularly corroborative of one another; although the more recent analysis is that on which we must rely, on account of the great improvements in analytical chemistry since the time of Dr. Pearson. We are indebted to Dr. Pearson for the first discovery of nitrogen in these waters, and for the discovery that the quantity of carbonic acid they contain is very much less than what is found in most common spring waters.

Dr. Pearson's analysis is singularly creditable to him, as the following results at which he was able to arrive clearly show. From 3 gallons of the water he obtained  $44\frac{1}{2}$  grains of saline matters, which he found to consist of  $5\frac{1}{2}$  grains of '*sea salt*' (muriate of soda),  $7\frac{1}{2}$  grains of '*vitriolic selenites*' (sulphate of lime), and  $31\frac{1}{2}$  grains of '*calcareous earth*' (carbonate of lime); or he found in the gallon of water, to use his own words, "that the quantity of each of these was about one grain and three-fourths of sea salt, two and a half grains of vitriolic selenites, and ten grains and a half of calcareous earth." This would give as the solid constituents of a gallon of the water,

	GRAINS.
Carbonate of Lime . . . . .	10.5
Sulphate of Lime . . . . .	2.5
Muriate of Soda . . . . .	1.75
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	41.75

or  $14\frac{3}{4}$  grains ; making a difference of only one quarter of a grain between the amount of solid contents found in these waters by Dr. Pearson, and that found in the more recent analysis.\* No one can be otherwise than astonished at the high degree of skill which must have been possessed by a man who, so many years ago, could succeed in showing that the principal solid constituent is carbonate of lime, and in ascertaining within a quarter of a grain the quantity of saline constituents in the gallon of water.

Dr. Thomson, of Glasgow, in his able article on Mineral Waters, in the Cyclopædia of Practical Medicine, says—"The existence of azotic gas in this water, without any trace of oxygen, is not easily accounted for. In general, the azotic gas contained in mineral waters is merely what is

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\* I am aware that this differs by a grain from what is very commonly given as the result of Dr. Pearson's analysis.—Dr. Denman's work states it to be  $15\frac{3}{4}$  grains, and other works have probably taken the results of the analysis directly from this source. The very words of Dr. Pearson are given in this extract ; and although the Doctor mentions having found 16 grains of solid matter in a gallon of these waters, this contradicts all his previous and subsequent assertions ; and there can be little doubt that we are warranted in giving  $14\frac{3}{4}$  grains of solid matter in the gallon of Buxton water as the result of his most able experimental researches.

imbibed from the atmosphere. It is accordingly mixed with oxygen gas ; and as oxygen gas is more absorbable than azotic gas, the gas extricated from water by boiling is richer in oxygen gas than common air. When a water contains an impregnation of sulphuretted hydrogen gas, all the oxygen which it may have absorbed is of necessity abstracted. Water in such a case may contain carbonic acid gas, and it may contain azotic gas ; but here we have a water deprived of all its oxygen gas, without containing a trace of sulphuretted hydrogen gas. The quantity of azotic gas present is precisely what ought to be contained in Buxton water, on the supposition that it was imbibed from the atmosphere. But what has become of the oxygen gas ? The imperial gallon should contain one and a half cubic inch of it. We suspect strongly that it would be found, were the water properly examined. For example, if a drop or two of newly dissolved sulphate of iron were dropped into a glass of Buxton water, and afterwards a drop of caustic potash added, it would be easy to see whether the water contained oxygen gas. If it did, the iron would be precipitated yellow ; if it did not, it would be thrown down of a dirty green, which would not alter its appearance."

Although the elevated temperature of these waters, the uniformity of their temperature, and



other circumstances, would be sufficient to distinguish them from all common spring waters, and to render their origin from the atmospheric waters, or from the more superficial strata of the earth, most unlikely, if not impossible; yet, were the nitrogen contained in these waters probably derived from their being mixed with atmospheric air, the difference in chemical constitution between these waters and common calcareous spring water would be most insignificant, and their medical effects could not be attributed in any degree, however slight, to what is known of their chemical composition. But, according to the experiment suggested by Dr. Thomson in the passage quoted above, this is not the case; according to this, these waters do not contain oxygen gas. I dissolved caustic potash and sulphate of iron separately in distilled water; and “a drop or two of newly dissolved sulphate of iron were dropped into a glass of Buxton water, and afterwards a drop of caustic potash added,” and the precipitate thrown down was of a dirty green colour.

These waters are inodorous. They have a slightly calcareous taste. They are singularly transparent—so much so that the most minute object may be seen at the bottom of the bath. The specific gravity of the waters at the temperature of 77 degrees is stated to be 999, and 1-0006 at the temperature of 60 degrees.



It would little interest, and as little profit the reader, were I to dwell longer on the chemical constitution of the thermal waters of Buxton. It is enough that it be determined how inadequate what chemistry has hitherto told us of the composition of these waters is to throw any light on their medical properties. They act occasionally as an aperient, frequently as a diuretic, and generally as a stimulant, to a degree that neither their temperature, nor their chemical composition as far as it has been ascertained, will enable us to explain, or could have led us to foresee.

In any endeavour to account for the effects of these waters, when used in the form of the bath, great importance must be attached to their unvarying temperature. Dr. Granville says, in his recent work on the spas of Germany, "But there is, in my estimation, a still greater superiority on the side of the Wildbad spring, as a salutary bath, over every other,—no matter how well managed the latter be; and that is the simple fact that, whereas in all the other baths the temperature of the water in which the patient is immersed, must and does progressively diminish, in the course of the hour, or half an hour even, during which the operation of bathing lasts—that of the water of the Wildbad bath is uninterruptedly the same, for the water continues in its never-varying

natural condition." And it is a very important observation. It is impossible that a tepid bath can be prepared of artificially heated water, that shall continue at the same temperature all the time the bather remains in it. But this advantage is enjoyed by the naturally tepid baths of Buxton, as completely as it is by any other thermal baths whatever. Water is constantly pouring into these baths, and pouring out of them ; there is a regular and never-ceasing current passing through them ; and they are always, at all seasons, at the very same temperature.

How little is to be learned as to the effects of these waters on disease, from a knowledge of their chemical composition and temperature, is fully shown by the following results, which have been gathered from the reports of the Buxton Bath Charity for the last eighteen years—from 1820 to 1837, both inclusive. Deducting the cases which have remained on the books at the time of making up every yearly report, from the total of the cases admitted during the year, and adding these cases to the total of the cases admitted and dismissed before the making up of the following year's report, it appears that 21,468 patients have been admitted on the books of this charity within the above-mentioned period. Of these, 6,562 have had medical advice, medicines, and the use of the baths, gratuitously. The remaining 14,906

cases have had the gratuitous use of the baths and medical advice, and been supplied with all necessary medicines, and received pecuniary relief to the amount of five shillings per week for the space of three weeks. Of these latter cases only, has an account been kept, as to the degree of benefit derived from the use of the waters. It appears that of the 14,906 patients, 12,608 have been dismissed "cured or much relieved," the remainder having been either little relieved, or no better at the time of dismissal. When it is remembered, that nearly the whole of this vast number of cases have been chronic cases, and that hardly any of them have been longer than three weeks in Buxton, the amount of relief afforded would be sufficient proof, if proof were wanting, that these waters are of powerful efficacy, and that the amount and character of their effects must be judged of by the results of cases, and not by a mere reference to their chemical composition.

## CHAPTER VI.

“As common springs contain the same solid substances discovered in Buxton water, and in much greater quantity ; and as, from the known properties of these substances, we have no reason to expect any beneficial effects from them in diseased states in the proportions in which they are contained in these springs, the consideration of them may be neglected in practice, and the peculiar medicinal effects of Buxton water must be sought for on other principles.”

DR. PEARSON.

It may be useful to describe the usual effects of bathing, before entering into the consideration of the peculiar effects produced by bathing in the waters of Buxton ; especially if this be done with a view to explain some of the more simple physiological effects of bathing, and to enable us to contrast these effects with those which are produced by bathing in the Buxton waters.

The first effect of immersion in cold water, at the temperature of sixty degrees, on a person in health, would be ‘a shock,’ or a sudden and great impression on the nervous system ; and immediately consequent on this, and dependent upon it, the blood-vessels ramified over the surface of the body would suddenly contract upon their contents, and the blood contained in them be propelled to the large vessels in the interior



of the body, and to the heart. But this effect would be of very brief duration. The heart and the large vessels would be speedily excited to violent exertion, to get rid of the undue quantity of blood with which they would thus be gorged. They would contract energetically upon their contents, propel the blood once again to the surface, and there, no longer interrupted by the spasmodically contracted state of the small vessels of the surface, but the passage of the blood being rather facilitated by the state of those vessels which would have succeeded it, the blood would be driven back again to the heart with an additional momentum, and what is called re-action would be said to have taken place—the circulation of the blood would be performed more vigorously than it was before the immersion. The sudden contraction of the superficial blood-vessels would be followed by temporary relaxation, this would be followed by a modified and partial recurrence to the contracted state, which would result in a second but less violent shock, were it not met by the active state of the heart and large blood-vessels, which would enable them to relieve themselves of their contents as fast as they might be filled—up to a certain point. Let us suppose, that this continues until the heart and arteries are wearied out by the continued exertion, and that the bather still remains in water, the temperature of which



is so much below the temperature of his body—which temperature such extraordinary efforts have been made to maintain at its necessary degree of elevation. The result is, that the circulation gradually loses this active character; it becomes enfeebled, and is imperfectly performed; the temperature of the body is diminished; the distribution of the blood is no longer equal throughout the body; a sensible chill is experienced, and the individual is forced to leave the water, greatly exhausted, and shivering with cold. The internal organs are now gorged with blood; some one organ, in all probability, suffering more than the rest. After a severe struggle, reaction is brought about; but in few cases will it be confined to what is necessary for the purpose of restoring the equilibrium of the circulation: it will be greater than is required for the well-being of the system, and a disordered febrile state will result, probably attended with an inflammatory condition of the part or organ that has suffered most severely during the depressed state. Precisely the same effect may be expected to be produced if the immersion be made in water, the temperature of which is lower than the energies of the system are able to resist with sufficient celerity. Precisely the same effect may be expected, if the bather have ventured into cold water, when his system had been too much exhausted, by disease or other

causes, to be able to resist the shock it has had to sustain. The heart and large vessels have not in either of these cases power to get rid of the load of blood with which they are surcharged by the contraction of the capillary vessels of the surface; a serious degree of interruption to the circulation of the blood is the result; that elevated temperature which is necessary to the body's well-being is not maintained; and any set of vessels may become so far overloaded as to be unable to relieve themselves, until irritation has been excited in them to a degree which results in disease of the part.

Debility, resulting from disease, or any other cause; the temporary debility, or exhaustion, which follows severe or long continued bodily exercise, or arises from deficient sleep; or the similar condition of the nervous system which attends mental despondence, would each and all unfit the organs of the circulation for resisting the shock of the cold bath, and producing a sufficiently speedy and complete degree of re-action. Any cause, that would debilitate the vessels which supply any of the more important internal organs, would render the re-action consequent upon immersion in cold water less certain in that part, and involve much risk of the immersion being followed by disease. If the vessels of any of the internal organs are in a state of inflammatory excitement, immersion in cold water might

be expected to increase that excitement, and to aggravate the morbid state. The more deeply seated, and the more important the organ thus affected, the greater would be the probable amount of injury thus produced.

But there is another cause, besides general debility, or general exhaustion, or an excited state of the vessels of any of the internal organs, which renders immersion in cold water a dangerous measure ; and this is a cause which my experience in the use of Buxton waters leads me to consider particularly deserving the attention of the visitors of Buxton. There is a morbid state in which the system is overloaded, or in which one or more of the more important organs are overloaded—and it is a state which is very commonly the precursor of general or local disease,—which is little marked by pain, or other very sensible symptom of disturbance ; being much more commonly indicated by extreme sluggishness of the general system, or of the part specially affected. When the brain is in this peculiar condition, the faculties are remarkably obtuse ; there is great tendency to drowsiness, and the sleep is heavy and unrefreshing ; while the sight is apt to be dim, the hearing dull, and sometimes the sense of taste imperfect. When the liver or the kidneys are in this state, they are torpid in their action, and their secretions are at once morbid and scanty.

Immersion in cold water under such circumstances as these, is always most hazardous ; for the obvious reason, that the vessels of the system generally, or of the part specially affected, are already overburdened with work, and cannot dispose of an increased quantity of blood, without the immediate supervision of more serious disease. The same observation applies in some degree to immersion in tepid water, but if the water used is, like the waters of Buxton, peculiarly stimulating in its effects, it will apply to a degree proportioned to the stimulating effect of the water.

Whatever has the effect of diminishing the energies of the nervous system, such as fatigue, loss of sleep, &c., takes from the certainty of speedy re-action after immersion in cold water, and causes bathing to be attended with risk. Whatever concentrates the powers of the nervous system on any particular organ or function, renders the re-action after immersion much less certain, and makes the propriety of bathing more than doubtful. This is the case after taking food, and from one to three hours from that time, according to the powers of the stomach, and the rapidity with which the food is digested, and in some degree according to the digestibility of the food. During the earlier stages of digestion, very much of the nervous influence is directed to the stomach,



and a very considerable extra quantity of blood is transmitted to it ; and the less of nervous influence the individual may have to spare, and the less the degree of vigour possessed by the organs of circulation, the more imperative is it upon him that he do not venture into cold water, until the process of digestion is almost completed. That much of the nervous influence is thus directed to the stomach during the digestion of food, is sufficiently shown by the drowsiness so universally experienced for some time after a full meal has been taken ; by the sleep required after a meal by those whose digestive functions are feebly performed ; by the constant tendency to sleep after dinner, and indeed after the other meals, which is felt by those who have undergone an extraordinary degree of mental or bodily exertion, and by those whose nervous energies are greatly affected by old age or infirmities.

If all due care be taken, that the temperature of the water is not so low as to communicate a greater shock to the system than the individual's powers are able to resist, and the shock be of very brief duration, the re-action almost immediate, and sufficiently great ;—if the individual remain long enough in the water to call into action all the energies of his nervous and circulating systems, in order to maintain the temperature of the body at its necessary elevation, and not so long as to



depress the vital energies, or induce an undue engorgement of the internal organs, or reduce unduly the temperature of the body ; if the individual use the bath only when the nervous and vascular energies are so active, and otherwise unemployed, as to superinduce prompt and efficient re-action ; if the bath be used as frequently as the powers of the system are able to bear, and not so frequently as to expend them unduly, the bath will act as a sedative ; by which an individual in moderate health will have that health confirmed ; by which a person in a state of debility will have the strength restored. But the effects of the bath might be illustrated further than this, with the view of contrasting them with the effects of bathing in the Buxton waters. If the temperature of the water, and the time the individual remains in the bath, be adapted to the case, bathing will act in cases of excitement as a sedative, in cases of fever as a febrifuge. By diminishing the febrile heat of the body, by stimulating the blood-vessels of the surface, by exciting the organs of secretion, by equalising the distribution of the blood, the cold or tepid bath is useful, even in such cases as these.

These observations will not be found to apply to the effects of the baths of Buxton. Their effects on health and disease are very different from those which attend bathing in ordinary water of any

temperature. These effects will not be the less fully appreciated, from the contrast they will be found to offer to those which have been mentioned.

The most remarkable effect of Buxton waters if used internally, and in a much more extraordinary degree if used externally, is their stimulating effect. A man in health cannot bathe repeatedly in these waters with impunity. This shows a marked, and sufficiently conclusive and convincing difference between Buxton waters and ordinary water, to satisfy those who may be inclined to think, that these waters act only by virtue of their temperature, or only in the way that any other water acts on the animal economy. A man must not only not be over-loaded in his general system, or in any of its more important organs; he must not only not be in a state of real excitement, or in an acute or sub-acute inflammatory state; but he must not be in a state of health; he must be below par—his system must be reduced below the standard of health, in the discharge of its various functions, to be able to use these waters with safety; their utility, under such circumstances, being put quite out of the question.

In nearly every case, the effect produced by these waters, when used internally, unless in those whose systems from long use have become habituated to them, and unless the individual's powers are

below the healthy standard, is *excitement*, an approach to feverishness; with the thirst, restlessness, &c., consequent thereupon. In most cases, this yields to a dose of common aperient medicine; and it is seldom that any further inconvenience is occasioned by them, than may be relieved by having recourse occasionally to these simple means. Far different is it when these waters are used externally, in the form of bath, and as often as three or four times a week. The excitement thus produced is greater than exercise, or attention to diet, or regular hours, or repeated doses of opening medicines, can subdue; and it is found necessary to desist from bathing, and in most cases to lower the system considerably, before the feverish state thus produced can be moderated, and health restored. These effects are all aggravated materially, if there had been a state of excitement present before the baths were used, or if the digestive organs had been deranged, or if any of the internal organs had been excited, or prone to excitement. Every year many cases of very serious illness occur, from a very few baths having been taken under such circumstances as these. How it happens, that a man who has used the shower bath, or the cold bath, or the tepid or hot bath, or who has been accustomed to bathe in the sea, or to use hot or tepid sea-water baths, and without injury, or perhaps with benefit,

is thus excited and thrown out of health by bathing a few times in these waters, is a question which strikes at the root of the *modus operandi* of the Buxton waters; and this must be admitted to be quite inexplicable. We only know that it is so; and it is a knowledge confirmed by case after case, and demonstrated fully every season, by persons who are fool-hardy enough to run the risk, or ignorant enough not to know that there is risk, from bathing in these waters under such circumstances. It may be, that a portion of the saline and calcareous and gaseous impregnation is absorbed through the skin during the immersion in the waters; and, most assuredly, the specific effect of the water is greatly increased as the individual remains longer immersed in it. It may be, that the effect is merely mechanical or merely chemical; or that it is dependent on causes, of which even modern science is as yet ignorant. However this may be, it is of infinitely more practical moment that we know these waters to be capable of producing such and such effects, than that we should know how they produce them.

As might be expected from the temperature of these waters (82 degrees), the temperature of the body being pretty generally 96 degrees, their first effect on the bather is slightly chilling, even supposing him to be in a state of health. This,



however, does not, or should not, last longer than a very few seconds. It is commonly followed, almost immediately, by a glow of excitement, much greater than bathing in common water ever produces; while, chiefly owing to the alkaline properties of the water, the skin is speedily cleared of all scurfiness and impurities, and is rendered most singularly and delightfully smooth. But the degree of glow experienced while in the water is not the only effect of these baths; nor is it only the case that, for the most part, the rheumatic lose, for the time, their pains, the debilitated invalid his sense of weakness, and the cripple his lameness; their effect on the spirits is, I would venture to say, singularly great. It is not too much to say, that the mind's excitement is calmed, or its irritability soothed, or its depression relieved. In from a few seconds to ten or twelve minutes, the individual leaves the water, with a delicious sense of warmth through his whole system, with a full consciousness of the unbounded enjoyment that attends the active discharge of the vital functions. Supposing him, as we have done, to be in a state of health, he finds, for the next twenty-four hours, that all his energies are augmented, that his appetite is sensibly increased, his digestion unusually active, his mind singularly free from despondence or irritability. This may be said to be the primary

effect of the Buxton baths. They are immediately stimulating, not only to a much greater degree than ordinary water of the same temperature, but to a greater degree than any mineral water I have heard of. When I read, and learn from numbers of people of rank and character who have visited them, that in the case of many of the celebrated thermal springs on the Continent, the bather may begin his course of baths without more pointed reference to his state of health than is involved in a particular inquiry as to his being free from head-ache, and as to his bowels being sufficiently open; and that he may bathe every day, and remain in the water for half an hour and upwards, and drink as much of the water as he can manage to swallow, and all without risk;—I may be pardoned if I think their effects on disease must be much inferior to the effects of a water which I know cannot be used to any such *ad libitum* extent, without injury. It may be fearlessly said, that a man in health cannot bathe in the waters of Buxton for more than a very few successive days, without bringing on a degree of excitement that will amount to disease, and require treatment accordingly. It may very safely be said, that very few individuals, let their condition as to health or disease be what it may, can bathe oftener than four or five times a week, without superinducing

a dangerous degree of morbid excitement; and that few will bear a succession of baths, even with the intervention of one or two days a week on which the baths are not used, of longer than from ten to fifteen minutes each, without suffering bad consequences therefrom. Might it not be inferred, with justice, from the bare statement of such facts, that these waters must have a much greater effect on the animal economy than waters which may be used with impunity, and perhaps with advantage, to so much greater a degree?

Let us suppose that the man in health goes on bathing for a few days. The effect at first experienced—the excitement and consequent vigour—is exchanged for a sluggish condition of the vital functions, for the torpor which indicates an overloaded state of system; and if this be not relieved by the appropriate depletory measures, and above all, if the use of the baths be not discontinued, it is succeeded by a feverish condition, which probably involves some one organ more than the others, and which is either relieved by some natural channel, or speedily renders the importance of medical treatment sufficiently apparent.

If there had been more or less of a congestive state present before the baths were used at all, if any one organ had been seriously overloaded or seriously excited, the result would be

much more marked, and be productive of much more serious consequences. To this we are fairly justified in ascribing the wonderful power possessed by these waters, in bringing on a decided attack of gout, in those whose systems had been too feeble to throw out the disease. To this we may ascribe the marked exacerbation of this disease, after a very few baths, when the baths had been used without reference to the stage or variety of the disease—when, in fact, it had been in too acute or too active a state to bear the stimulating effects of these waters. To this we may ascribe the aggravation of rheumatic pains, when the baths had been used under circumstances of general congestion, or general feverishness. To this we may ascribe the accession of head-ache, loss of appetite, thirst, indigestion, costiveness, &c., when the dyspeptic had ventured to bathe under the circumstances of a congested or an excited state of the digestive organs.

In this general view of the medicinal properties of the Buxton waters, enough has been said of their primary and stimulating effects. Their secondary effects have now to be mentioned. Supposing all proper precautions to have been taken; supposing the case to be adapted in nature, character, and stage, to the effects of the waters, and that the individual continues to use them for a definite time, during which they per-



fectly agree with his case ; the time at length comes when the nervous energies are somewhat expended, when the stimulation is followed by an exhausted or debilitated state, when, in fact, a state succeeds the stimulation, which may not be unaptly compared to the exhaustion which follows the primary effect of stimulating liquors. To watch the supervention of this secondary effect of the baths of Buxton is of the greatest importance in a practical point of view, and for several reasons. The powers of the waters are seldom fully exerted until this effect is produced. An individual may feel greatly relieved ; his pains or his infirmities may have well nigh, or entirely left him ; he may feel almost well, or completely cured ; but the conclusive proof that the waters have had their full amount of influence on his system, is only to be found in the sense of evidently supervening debility. These waters have not only been found to have a singular degree of power in curing certain kinds of disease under certain circumstances : but, in very many instances, they have the power of rendering the system free from fresh visitations of the malady for many years. This, which may be called the preventive effect of the waters, can seldom be expected with anything like confidence, unless the waters have been used to such a degree that the secondary effects have been decidedly induced.

But an individual may use the baths of Buxton whose system is already greatly reduced ; in whom hardly any of the primary or stimulating effect is to be observed ; who may have experienced the debilitating effect almost from the first. I shall not discuss the advisability of giving tone to the system of such an invalid by appropriate medicines, preparatory to the use of these waters, or in connection with their use ; nor need it be more than alluded to, that the artificially-heated Buxton waters might be used with advantage as preparatory baths. It is more to my immediate purpose to mention, that in such a case, the period of immersion in the natural waters should be materially diminished ; and that probably, in such a case, little more than a momentary immersion, every second or even third day, will be found to answer every desirable purpose.

Nothing in fact can be more variable than the period during which individuals should remain in these baths. It not only varies in similar cases in different individuals, but in the same individual at different times. It is almost always advisable, that little more than a momentary immersion be allowed at the first ; that this be gradually increased, as there is less of the primary or stimulating effect experienced, to five, or ten, or fifteen minutes ; that the longest time allowed for the immersion be that at which the waters are found

to be sensibly stimulating, that this period of immersion be continued until the secondary effects of the waters are manifested ; that then the period of immersion be diminished, a shorter period being allowed for every subsequent bath, until the use of the baths becomes no longer expedient. It is of importance that this last direction be borne in mind, as the secondary or debilitating effects of the waters may be simulated by many accidental and temporary causes ; whereas, by the means mentioned, this effect is put beyond a doubt, while the risk of needlessly or injuriously debilitating the system is avoided. It has occasionally happened, that when the secondary effects of these waters had appeared to have supervened, and the period of immersion had consequently been shortened, the result has been the manifestation of the exciting effects once again. This appears to be proof enough, that in such a case the waters had not exerted their full power on the system, that their use for a longer period was indicated ; and it should warn us against pronouncing without a minute and accurate investigation into a case, or without gradually diminishing the period of immersion in the way I have mentioned, that the waters have had their full effect in any individual case, even when debilitating effects have supervened on their use.

It may be considered a singular fact, that other

things being equal, both the primary and the secondary effects of these waters are observed to be proportioned in degree to the period of immersion, and the shortness of the interval between the baths. If the baths induce either much excitement or much exhaustion, it will not only be necessary to diminish the period of immersion in the waters, but to bathe less frequently.

The average time that an individual should remain in the bath may be said to be from four to twelve minutes. The average frequency of bathing is from every third or every second day, to bathing on two successive days, omitting the use of the bath on the third day.

The best time of the day for using the bath is that in which the system is most vigorous, and its energies least diverted from the important duty of sustaining the shock produced by the immersion, and bringing on a prompt and efficient degree of re-action. This time is decidedly soon after rising in the morning, when all the powers of the system have been refreshed and re-invigorated by sleep and quietude, and before any of its energies have been expended in the digestion of food. It is, I think, a most undeniable fact, that the specific effects of these waters are most strongly manifested in those cases where the baths are used before breakfast in the early morning.

But, unhappily, there are two conditions of



system very commonly found in the invalided visitors of Buxton, which most decidedly contraindicate the use of these baths at this period of the day. If the invalid's powers have been much shattered, his system much reduced, his strength brought greatly below par, his system will not be able to resist the shock of immersion, nor to superinduce an efficient degree of re-action until after the first meal of the day has been taken. It is, however, of no small importance that a few particulars be attended to in such cases as these. The breakfast should consist of light, or easily digested materials, and the quantity of food eaten should be exceedingly moderate. It is of importance, in such a case as this, that the bath should not be used soon after taking food; while it is almost equally important that it should not be deferred until the digestion of the meal is completed, and the stomach empty. The relative facility of digestion possessed by different individuals varies so much, that it is difficult to fix the precise interval which should elapse between the breakfast and the use of the bath in individual cases. It may be said to vary from two to four hours. Should the process of digestion be attended with any sensible inconvenience, or should it be accompanied by any marked depression of the mental or bodily energies, it will be improper to use the bath until this has passed away. There

are few who have stomachs of such an accommodating degree of power as to perform their duties without affording more or less sensible indication that digestion is going on; and this is very commonly followed by a sense of increased desire for motion, of increased activity of thought. It may be, that a load seems at this time to be taken off the spirits, and that the mind is particularly disposed to cheerfulness. This is the time when the debilitated invalid should use the bath.

The other condition of system referred to, which is found to contra-indicate the use of the bath before breakfast, may be defined by the word *irritability*. The system is highly susceptible to the influence of all impressions. The individual is morbidly sensitive. The mind is easily excited, and as easily depressed. Any bodily derangement produces an undue and unusual degree of pain and anxiety. The system may be likened to an instrument out of tune, which jars when touched, or even when blown upon. This state is a frequent attendant on debility; but it is so far a distinct condition, that debility may exist without it, and that it is by no means uniformly accompanied by a degree of debility proportioned to it. The bath should not be used under these circumstances, until an hour or two after a light breakfast has been taken.

In all cases, the powers of these baths are manifested so much more decidedly when used before breakfast, that it is perhaps only in special cases that the invalid should begin his course of bathing by taking his bath at this period of the day. It will generally be better to use the bath at the first in the forenoon, from two to three hours after breakfast; and if the baths are not found to be unduly stimulating, and there is neither much weakness nor much irritability, their effects when used before breakfast may be cautiously tried. In fact, until it is no longer doubtful whether the baths will prove to be unduly stimulating or not, it will be advisable to bathe after breakfast. When, however, the effect of these waters on an individual has been put beyond a doubt, and it has been ascertained that the baths agree well, it cannot be too strongly insisted upon, that they be used before breakfast, if the specific effects of the baths are to be obtained quickly, or to the greatest possible degree.

The number of baths which are found to be necessary in the cases adapted to their use, is exceedingly variable. It may be said, that, generally speaking, the longer the duration of the complaint, the greater the number of baths necessary for its relief. It is equally true, that the younger the individual, the more rapidly is the complaint influenced by the waters. It is at

least equally true, that the simpler and more natural the individual's habits of life have been, the more rapidly will the waters influence his case. I attribute to this the well-ascertained fact, that the lower orders of people derive a much greater amount of proportional relief than do the middle and upper classes of the visitors of Buxton. It may, however, be remarked, that it is seldom we observe any very great or permanent advantage to be derived from fewer than twelve baths: that fifteen may be said to be the average number taken: and that more than from twenty to twenty-five baths can seldom be taken. After this number of baths has been taken, if their use is still indicated, it is almost always necessary or advisable to discontinue them for several weeks, and then go through a second course of baths. In obstinate, long-continued, and severe cases, I have seen the greatest possible advantage derived from this mode of proceeding. It may be added, that although the cases in which individuals have visited Buxton a second time during the same season have been amongst the most obstinate of the cases I have met with, they have been relieved to a degree very nearly equal to the average of benefit derived. It must be remembered, however, that these, although obstinate, have been picked cases—cases which the experience obtained in the first course of the



baths has proved to be especially likely to be benefited by the use of these waters.

The hot baths, which consist of Buxton waters artificially heated, constitute a most valuable auxiliary to what are commonly called the natural baths. If used at a higher temperature than 96 degrees, and only occasionally, their effects differ little from those of an ordinary hot bath, certainly little from those of a bath in heated calcareous water. But if used at a temperature of from 90 to 96 degrees, and more frequently and regularly, their effects are similar in their nature to those of the natural baths, *but less active in degree*. The happy result of this is, that an individual, whose system or whose local ailment, is in a state of too great excitement to render the use of the natural baths either advisable or safe, or whose system is too much enfeebled to be able to bear the shock of the natural bath, and to superinduce a sufficiently speedy and efficient degree of re-action, may very frequently bathe in the heated waters, not only without risk, but with benefit—affording time for the exhibition of such remedies as may be advisable to prepare the system for the use of the natural baths, and being in themselves a most efficient element in the preparatory treatment. This is the point of view in which these baths are most important.

There is, or at least seems to be, a peculiarity

in the effects of the heated waters, which is by no means analogous to the effects of the waters at the natural temperature, and more like what we know to be the effect of an ordinary hot bath. It must be premised, however, that the remark only applies to these baths when the waters are at a temperature of at least 96 degrees. If the individual remain in the bath at this temperature for a considerable time—from fifteen to twenty minutes, provided there be no congestive condition present, and only a state of excitement, their effect appears to be the reduction or diminution of the excitement. I am told by an intelligent surgeon, that he has frequently prescribed a bath of this kind in cases where there has been considerable inflammatory excitement of one or more of the larger joints, with the very best effects.

In general, however, the Buxton hot baths are to be regarded as having a primary stimulating effect; and especially when the person does not remain in the waters longer than from five to ten minutes, and when the waters are not of a higher temperature than 96 degrees. I think, that in the generality of cases—and especially in those where there is general as well as local excitement, and certainly in those where there is a congestive state present—the long-continued immersion in heated water is a most doubtful, if not dangerous measure; and that it should not be regarded as

being on a par with the common medicinal means by which general excitement or general congestion is relieved.

It has been a very common practice for invalids to take two, or three, or more hot baths in the first instance, by way of preparing the system for the natural baths. This is useful in some cases, but in others it is quite unnecessary. When, as has been remarked, there is such a degree of general or local excitement, as would render the immediate use of the natural bath a doubtful or dangerous measure, and yet not such a degree of excitement, as would suffer from the less powerful influence of the artificially heated waters; or where there is such a degree of debility as would render the system unable to bear the shock of immersion in the natural waters, and to bring on efficient re-action; the heated waters are valuable preparatory baths, or, it may be, constitute the only kind of bath the individual could use with advantage.

But it cannot be too forcibly impressed on the reader's mind, that these baths, if used at short intervals, and from five to ten minutes at a time, are stimulating; although not so stimulating as the baths of the natural temperature. I have not only seen active, but acute gout brought on by their use. Cases are occasionally met with, which are only enabled to endure their stimulating

effects without injury, by the constant use of the ordinary depletory medicines, and which, with this assistance, are benefited by these baths; but cannot be brought to bear the stimulation of the natural baths, by any accompanying treatment. The mention of this brings vividly to my mind an interesting case of active, *not acute*, rheumatism, which had supervened upon the chronic form of the disease, that was aggravated so materially by the injudicious use of the natural baths, as to require active treatment for its relief, and was only enabled to bear the stimulating effect of the warmer baths by the constant use of medicine, but with this assistance was at length entirely cured by the use of these baths only. This case illustrated one or two other facts. The patient was a manufacturer, of high respectability. He had been made to run through all the usual appliances of physic, and had tried the hot bath at home, and all in vain. He got worse and worse. His medical attendant sent him to Buxton. Including the time spent in making an unprofitable trial of the natural baths, in relieving the excitement brought on by its use, and in going through a course of the warmer baths, he could not have been much longer than a month in Buxton; but he left it completely relieved from his complaints.

In cases where the system is not in such a state of excitement, as to make it doubtful whether



the more powerful stimulating influence of the natural bath would be borne without injury; or where it is not so debilitated, as to render it doubtful whether immersion in the natural bath would be followed by an efficient degree of reaction; the use of the warmer baths is to be regarded as unnecessary, and as only involving a useless expenditure of time.

In all cases whatever, one of the most important general observations that can be made, with reference to the use of these waters as a bath, is that they should be used when the circulation of the blood is as free, and the blood as equally diffused as possible. The effect of digestion in causing a large amount of blood, and of nervous influence to be directed to the stomach, and by so much diminishing the powers and energies of the system generally, has been already mentioned. Exercise, from its well-known effect of quickening the circulation of the blood, accelerating the respiration, equalising the distribution of the blood, diffusing warmth through the extremities, and stimulating the nervous system, is one of the best and most necessary precursors of the bath. It has happened to me to have seen several cases, of a nature the most likely to have been benefited by the external use of these waters, on which the baths had no good effect, owing to the impossibility of using an adequate amount of exercise, on

account of the crippled state into which the individuals had been brought by the nature or long continuance of the disease. In these cases, the degree of re-action which is commonly experienced after the use of these baths—a degree of re-action which I think to be greater than is experienced after the use of any other kind of bath—was either never felt, or felt most imperfectly ; even when the immersion had been of only momentary duration, and when the artificially heated bath had been used. It should be borne in mind, that in cases such as these, the stimulating effects of the waters should be looked forward to with much caution, as they are apt to involve a very serious degree of constitutional excitement. In fact, in cases of this kind, when every preparatory means has been used—the patient brought into the fittest possible state to make use of these baths ; the best period of the day for making trial of them selected ; the surface of the body well rubbed with the flesh-brush in the patient's own room before going to the bath, in order to produce, in some degree, the same effects as would follow muscular exercise ; the period of immersion made to suit the individual case, and the bath promptly followed by friction over the whole surface of the body with warm dry cloths—and the bath, after a second or third trial, is unfollowed by speedy and efficient re-action, I feel little

hesitation in saying, that no benefit can be expected from the use of these baths. To those who are not in this unhappy condition, a sufficient degree of exercise to throw the system into a glow of heat, without superinducing any sense of fatigue, cannot be too strongly enjoined, as an indispensable measure before entering the bath. Not only will the effects of the bath be infinitely more pleasurable, but the consequent re-action will be rendered considerably greater and more satisfactory, and the specific effects may be looked forward to with very much more certainty \*.

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\* "In the earlier stages of exercise, before profuse perspiration has dissipated the heat, and fatigue debilitated the living powers, nothing is more safe, according to my opinion, than the cold bath. This is so true, that I have for some years constantly directed infirm persons to use such a degree of exercise, before immersion, as may produce some increased action of the vascular system, with some increase of heat, and thus secure a force of re-action under the shock, which otherwise might not always take place. The popular opinion, that it is safer to go perfectly cool into the water is founded on erroneous notions, and sometimes productive of injurious consequences. Thus, persons heated and beginning to perspire often think it necessary to wait on the edge of the bath until they are perfectly cooled, and then, plunging into the water, feel a sudden chilliness that is alarming and dangerous. In such cases the injury is generally imputed to going into the water too warm, whereas in truth, it arises from going in too cold.

"But though it be perfectly safe to go into the cold bath in the earlier stages of exercise, nothing is more dangerous than this practice, after exercise has produced profuse perspiration, and terminated in languor and fatigue; because, in such circumstances the heat is not only sinking rapidly, but the system parts more easily with the portion that remains."—DR. CURRIE'S MEDICAL REPORTS.

For the very same reasons, the time allowed for remaining in the waters should be employed in pretty active exercise, unless this is specially contra-indicated by the peculiar circumstances of the case. Rubbing the surface with the hand or the flesh-brush, and swimming, or as near an approach to it as the individual can accomplish, should occupy him during the whole period of immersion.

There is no one point that should be more distinctly impressed on the mind of the bather, than the importance of throwing a few handfuls of water over the head before going into the bath. In cases where, from the length of the hair, or other causes, the head cannot with propriety be wetted, and in which a bathing cap is made use of, this measure may nevertheless be had recourse to, and with advantage. But, for obvious reasons, more water should be poured over the head in this case, covered as it would be by the oiled silk cap, than would be necessary were the water permitted to come into immediate contact with the head. This is of much use in preventing any inconvenient or serious determination of blood to the head from being the immediate consequence of the shock of immersion. Cases have occurred occasionally, in which the head could not be immersed in the water, nor wetted with it, without producing considerable inconvenience ; but we are



justified in regarding these cases as idiosyncracies. With reference to the use of the bathing cap, it should be observed, that whenever this is not absolutely indispensable, and when the specific effects of these waters are desired, it is at best useless, may prove injurious, and has appeared to interfere with the effect of the bath. It may be said very confidently, that undue determination of blood to the head is more apt to occur when the bathing cap is used than when it is not. In cases where an undue determination of blood to the head might be apprehended, it is advisable to have from one to four pints of water poured over the head before going into the bath.

If the head have been thoroughly wetted previously to immersion, it is of little consequence in most cases whether the individual jump or walk into the bath. I am disposed to think, however, that in some instances the shock produced by jumping into the bath is greater than is desirable, and to say, that as a general rule it is better for the greatly invalided to adopt the more slow, but less formidable expedient of walking quietly down the bath steps, plunging the head under water as soon as possible.

In most cases re-action is almost immediately consequent upon immersion, and continues until the individual leaves the water, unless, unhappily, he have remained too long in the bath. In the

case of the majority of invalids it is well to proceed at once from the bath to the hotel or lodging, and to remain quiet, recumbent or not, according to circumstances, from half an hour to an hour; then to partake of either a light luncheon, or dinner, and then to drive, ride, or walk, as may be. It is seldom well to take out-of-door exercise immediately after the use of the bath, or from half an hour to an hour afterwards.

The use of the *douche*, or the forcible impulsion of the waters on different parts of the body by means of a double-actioned forcing-pump, remains to be mentioned. This is more especially useful in indolent swellings of the joints, in cases where there is a sluggish condition of the vessels of a part, and an evident diminution of its sensibilities. It is of much service in old rheumatic cases, whether affecting the muscles of the back, or those of the extremities, and in cases where, as the consequence of sprains or other accidents, there is a debilitated condition of particular muscles. It is a very powerful application, and its use should be begun with caution. From ten to twenty strokes of the pump will generally be found to throw as much water on the part affected as will serve to stimulate it sufficiently the first and even the second day of trying this remedy; and the latter number of strokes must be increased to fifty, or a hundred, or more, according to the

amount of effect produced. It should be observed, that when a part exhibits a tendency to inflammatory excitement, the douche ought not to be tried ; and that where there is much morbid sensibility of the part affected, it will seldom do any good, but more commonly be hurtful. It is in general used in conjunction with the baths ; but in cases where the complaint is local, and the use of the bath is contra-indicated, the douche is frequently used with advantage. In many cases which are adapted to its use, the douche may be used every day, whereas it is not proper in any case to bathe every day in these waters. As has been said, these baths cannot be used oftener than two days in every three days, without incurring a considerable degree of risk ; whereas, in cases adapted to it, the douche may be used every day with an evident increase of benefit. It is usually advisable in cases where both the baths and the douche are to be tried, to begin with the use of the bath, and that the douche should not be made use of, until two, or three, or more baths have been taken.

## CHAPTER VII.

“ With respect to the drinking of mineral waters, great regard must be had to particular circumstances, which are to direct us in the choice of a proper water, and the management of the patients during the course. ’Tis impossible to lay down such general rules relating thereto, as will not be liable to various exceptions.”

SWAN’S NOTES TO SYDENHAM’S WORKS.

THE effects of the Buxton waters, when taken internally, are, in some degree, the same as those produced by them when used as a bath. Indeed so similar are these effects, that it is difficult to avoid thinking that in the latter case, some of the water is absorbed by the vessels of the skin, and so introduced into the system. At all events there can be no doubt of the fact, that the first effect of these waters, when taken internally, day after day, in sufficient quantity, is stimulating. When used improperly, they induce thirst, loss of appetite, disturbed digestion, constipation, and feverishness. For the first day or two, they frequently induce a slight degree of giddiness, immediately after the dose has been swallowed. In general, this is only of momentary duration ; and it may be compared to the shock which is usually felt at the instant of immersion in these waters. In fact, these effects are, in all probability, physiologically the same ; being the



consequence of the great and sudden impression which is made on the extremities of the nerves ; in the one case on those which are ramified over the skin, and in the other on those which are distributed over the stomach. As, however, in this latter case, the effect is apt to be alarming to the individual, and is perhaps better avoided under any circumstances, it will be well, in most cases, to take the first, and perhaps the second, and even the third dose, slowly, instead of swallowing it rapidly, as is to be advised afterwards. It happens occasionally, that this effect is not momentary ; and that it does not pass off, leaving the person in the state in which he was previously to taking the dose ; but that it is followed by more or less of headache. In such a case, it is not only advisable that the individual should take the dose slowly for the few first days, but that he should not drink the waters until they have lost much of the gaseous impregnation. This would be the case in the course of a very few minutes. As the medicinal effects of these waters seem to depend in some degree on the nitrogen with which they are impregnated, and as much of this very speedily escapes in the form of gas when the waters are exposed to the air, it is necessary when their full effects are wished for, not only to drink the waters at the well, but to swallow the dose as rapidly as possible.

The usual first effect of these waters, when used internally, is, as has been said, very sensibly stimulating. When they agree, this effect very soon ceases to be produced to such a degree as to be appreciable by the individual, even when, as often happens, the pulse continues more full, and even more quick than usual, for some days longer. Among the ordinary primary effects of the waters is a degree of constipation, which renders the use of aperient medicine more necessary than usual; but this gradually ceases to be the case, and is often succeeded by a slightly aperient effect—in general to so trifling a degree as hardly to attract the notice of the individual, but sufficient to render the use of any aperient medicine less necessary—at times to so decided a degree, as to call the individual's attention to this effect, and render the use of any other aperient no longer needful—and at times to so considerable a degree as to render it expedient to use some corrective medicine, or even to make it necessary to intermit the use of the waters.

Several attempts have been made to account for these effects. It has been suggested that they may be classed under the same head as the well known action of very small doses of the neutral salts, when largely diluted with water; or, as the action of very small doses of any alkali, if similarly diluted, where there is an unusual quan-

tity of free acid in the stomach. In reply to any of the attempts that I have heard of, it need only be observed that these waters do not increase the effects of ordinary aperient medicine, as would be the case did they act in the same way as a diluted saline, or a diluted alkali, or did they act simply as a diluent ; but, on the contrary, they very frequently interfere with those effects.

There can be very little doubt that these waters do not act locally ; but that their effects are to be attributed to their general action as a stimulant. It seems, that when they stimulate beyond a certain degree, they disturb all the organs, cause the blood to be unequally distributed, oppress the nervous energies, and superinduce feverishness, and its common attendant—scanty secretion ; whereas, when they stimulate to a slight degree only, they increase the power and rapidity with which the blood is circulated, and—blood being the natural stimulant of all the organs—in this way cause these organs to act more freely than usual.

And, accordingly, we find that when these waters stimulate unduly, the kidneys become sluggish in their action, and the urine is scanty ; whereas, when they prove no more than slightly stimulating, their action on the kidneys is usually greater than their effects on the bowels—the quantity of urine is very sensibly increased ; and

in cases where it had presented the character of excessive acidity, the alkaline properties of the waters have done much to relieve this morbid state.

The amount of solid matters contained in these waters is so trifling, being in reality less than is found in almost any common spring water, that every attempt to theorise on their effects from what we know of the nature of these constituents, must necessarily fall to the ground. What we do know is, that in the cases adapted to their use, they not only cease to stimulate unduly, and cease to interfere with the action of the bowels and of the kidneys ; but their use is followed by a marked improvement in these particulars, and is found to be decidedly beneficial to several of the diseases with which man is afflicted.

The effects produced by these waters when used internally being similar to those produced by them when used as a bath, they are of service in most of the cases to which their external use is found to be beneficial. But they are to be regarded as being by no means equally efficient when taken internally, as they are found to be in the form of the bath ; although the effect of the waters drunk, superadded to that of the bath, is often found to be greater than consists with the satisfactory treatment of the case, and renders it necessary to intermit, or wholly discontinue the



drinking of the waters. This should be duly attended to, as in cases where there is some tendency to excitement, although not to such a degree as to render the use of the bath inexpedient, it is better not to attempt to use the waters internally, until the degree of effect that may be produced by the bath has been ascertained. At the same time, as these waters when used internally are much less active in their effects than when used as a bath, they may be taken advantageously in many cases in which the use of the bath would be improper. The degrees positive, comparative, and superlative, applied respectively to the internal use of the waters, the artificially-heated baths, and the baths at the natural temperature, will perhaps explain their relative amount of effect sufficiently well.

The quantity of the waters taken every day varies from half a pint to a pint and a half, or from this to a quart. Half a pint is the quantity commonly taken at once. It is usual to take the first dose before breakfast, and the remainder during the forenoon. It is justly considered to be most improper to drink the waters shortly before going into the bath. There can be no doubt that the waters produce more sensible effects when taken before breakfast, than when taken at any later period of the day. What has usually appeared to be the best way of pro-

ceeding has been, to begin their use by drinking slowly a quarter of a pint about two or three hours after breakfast, repeating this dose in about half an hour. If this is found to agree perfectly well, to take the doses more quickly. If this is productive of no sensible inconvenience, to take a third of a pint at each time. Then, if no contra-indicating circumstance arises, to take a third daily dose, of the same quantity, from half an hour to an hour before breakfast. If the waters still produce no sensible inconvenience, to increase the dose taken at each time to half a pint. It is seldom necessary to take more than a pint and a half of these waters every day; but cases do occasionally occur, in which it is found to be by no means wise to restrict the patient to the use of this quantity of the waters; but in which considerably more, and probably twice this quantity, is taken with advantage.

## CHAPTER VIII.

“ Whatever may be the deductions of theory from the analysis of Buxton water, or whatsoever weak and idle notions may be entertained concerning it, which arise from its want of taste and flavour, certain it is, from all manner of experience, that, in feverish and inflammatory complaints, it is found extremely prejudicial.”

DR. DENMAN.\*

THERE is an opinion which is very generally entertained, and very generally acted upon, and which is proved every year to be productive of much mischief, that demands notice in a work on Buxton waters. If an individual uses these waters, whether externally or internally, or both, with advantage to any particular complaint, in any season, he is apt to think that their use must be equally beneficial in any subsequent season; and that the preparatory means he then used must suffice, or must be equally necessary, in any subsequent trial of these waters. A gentleman, greatly afflicted with gout, had visited Buxton, with the greatest advantage, for many years. He had required little or no preparatory treatment. He arrived, took so many baths within a certain number of weeks, and then left the place compa-

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\* Observations on Buxton Water. By Jos. DENMAN, M.D. London, 1801.

ratively free from his ailments. At length, he tried this experiment once too often. He came to Buxton in a state of general congestion, which, as is often the case, he himself and his friends had mistaken for debility. He bathed, as he had done at his many previous visits; and the consequences were undue stimulation, an attack of gout, an excited state of the system, and a very serious illness. The treatment required was necessarily of the most active nature; he was greatly enfeebled, and left Buxton decidedly worse than he came to it. Satisfied as to the cause of this extraordinary change in the effects of these waters on his system, he lived abstemiously and carefully, and took appropriate medicines for a month or two, and then revisited the place. The baths were again tried, and not altogether without advantage. But much, and active medicine was found necessary to moderate the degree of excitement produced by them, and the benefit derived from their use was by no means equal to what it had been. He returned home, lived very carefully, took proper exercise and medicines, and, the following season, he visited Buxton again. His system was then below par, and the gout had reassumed its old character; it had lost its acute character, and had become chronic and indolent. He used the baths, and in a few weeks hardly any sign of gout remained.



A gentleman had visited Buxton with incipient gouty pains. They left him after he had bathed a few times, and he remained free from gout for five years; at the end of that time he again had indications of gout. He made use of no precautionary means, but allowed the disease to get worse and worse, thinking the waters of Buxton to be omnipotent in the cure of this disease, and to be equally adapted to all its stages and modifications. At length, he was compelled to submit to medical treatment; and, as soon as he could travel, he posted off to Buxton. He bathed a few times, when, to his surprise, all his symptoms became aggravated. In fact, he had visited Buxton in a state of inflammatory excitement; the constitutional feverishness re-acting upon and keeping up a state of active gout. He had bathed under these circumstances, had been quite unprepared to endure the stimulating effects of these waters, and had had all his complaints increased accordingly. He was actively depleted, the constitutional excitement was subdued, and then he used the baths with the greatest possible advantage. These cases, to which numbers of others might be easily added, will suffice to show, how important it is that the invalid should submit his case to his medical adviser before leaving home, in order that it be determined whether he is in such a state as to derive benefit from the use of

these waters, or whether a course of preparatory treatment may not be necessary or advisable; and these cases will suffice to point out to medical men, how important it is that they make themselves acquainted, as far as they can, with the medicinal effects of these waters, and with the states of system in which their use is contra-indicated.

Disease may be divided into two classes, one of which may be called disorder, the other, more strictly, disease. In the one, the function of the part is affected, and its supply of blood or of nervous influence may be excessive or deficient; but the structure of the part is unaltered, or not so far altered as to put it beyond the powers of nature to restore it to its original and natural condition. In the other, the structure of the part is irreparably injured. In nearly all cases of the latter nature, Buxton waters are not only useless, but really injurious; and the more that the disease, from its situation, or from the peculiar structure of the tissue affected, is under the influence of the circulation of the blood, the greater is the amount of injury sustained from the use of Buxton waters; and the greater the degree of excitability of system attendant on the disorganization, the more likely is the use of these waters to do harm.

Paralysis is dependent on many causes. It

may, for instance, be induced by exposure to cold, and accompany or follow a marked attack of rheumatism; or it may arise from the introduction of a mineral poison, as lead, or mercury, into the system; or it may be consequent on organic change in the substance of the brain. In the former of these cases, the baths of Buxton are of the greatest use; whereas, in the latter case, their use is hardly ever expedient, or even safe. It is evidently of no trifling importance, that such a fact should be known, and the distinction drawn between such cases, before the patient leaves his home on what may be a worse than useless errand to Buxton. A disordered condition of the heart's action is a very frequent attendant on indigestion, a very frequent concomitant and consequence of rheumatism; or such a state may be dependent on debility only. On the other hand, such functional disturbance of the action of the heart may depend on structural alteration in its substance or its valves. In the first description of cases, the cautious use of these waters is found to be most serviceable; in the latter kind of cases, these waters cannot be of any use, and are almost certain to prove injurious. In some of the varieties of disturbed respiration which follow inflammatory action in the lungs, more particularly in cases where the bronchial mucous membrane has been the part affected by

the disease, the Buxton waters are found to be most useful; whereas, in structural disease of the lungs, in all the modifications of pulmonary consumption, the use of these waters is almost always prejudicial.

In certain cases of functional derangement of the kidneys, we find the best effects produced by the internal and external use of these waters; in other cases of functional derangement of the kidneys, we find the internal use of these waters to be beneficial: whereas, when these organs have undergone organic changes, their external use is always contra-indicated, and their internal use is of very doubtful advantage.

After what has been said of the effects of these waters, and of the states of system in which their use cannot but do harm, it will not fail to excite surprise that people should visit Buxton—many of them, I am sorry to say, by the recommendation of their medical attendants—for complaints the most dissimilar in nature, stage, and degree. Numbers of the unhappy victims of pulmonary consumption, numbers in an advanced stage of hepatic disease, are found every year among those who have come to make trial of these waters. Not long ago, I saw a case of affection of the head, following a blow on the occiput, and attended and probably kept up by irregular action of the heart, which required depletory measures



to be had recourse to, that had been sent to try the baths of Buxton by a medical man who does not reside at a greater distance than thirty miles from this place. Cases of acute rheumatic inflammation of the joints are continually presented to us, which require an active course of local bleeding, blistering, &c., preparatory to a trial of the waters; which treatment involves a considerable loss of time, sometimes puts the individual to serious pecuniary inconvenience, sometimes renders it impossible that he should give the baths a trial, by causing his scanty funds to be expended before he is in a fit state to use the baths, and which treatment might have been undergone at his home, with equal advantage.

So extensively do these evils operate, that in a very large proportion of the cases we meet with, the nature of which happens to be such as these waters are calculated to relieve or remove, a course of preparatory treatment before quitting home would have been of much use; and in very few cases has anything of the kind been done to an adequate degree—it might almost be said to any degree.

It may seem that these remarks are needlessly extended and enforced. All that need be said in reply to this is, that no one could see case after case submitted to his observation, of such a nature as could only be injured by the use of

these waters, or in such a stage as renders the loss of much time necessary for preparatory treatment, that had been vastly better undergone at the patient's home, without having the question raised in his thoughts to so high a degree of importance, as to make the enforcement of the lesson it teaches a matter of primary moment with him, and cause him to linger over the subject, and at length leave it with a fear lest he may have urged it too little.

## CHAPTER IX.

“ It cannot derogate from the reputation of Buxton or any other medicinal water, to assert, that the use of it is greatly assisted by change of air, temperance, and regularity in diet, avocation from business or study, moderate exercise, early hours, and cheerful company.”

DR. DENMAN.

“ There is one thing I most earnestly recommend, and that is, not to indulge the appetite which these waters give.”

DR. HUNTER.

BEFORE concluding these general observations on the use of these waters, it may be well to mention a matter that is of no trifling importance, which might seem to be needlessly taken notice of in speaking of a watering-place, but to which experience has led me to attach a singular degree of value. I have found that people may exercise the mind unduly at a watering-place as well as at their homes. The mind cannot be too completely freed from its trammels of thought, it cannot be too entirely relieved from its ordinary duties, when the fabric it is connected with has been shaken by disease, and its restoration to its original condition is sought for in change of air, and scene, and society, in medical treatment, and in the external or internal use of a mineral water. Yet do we find the man of rank spending a large part of every day in carrying on his correspond-

ence, the man of literary taste devoting hours of every day to books, the man of business occupying himself in receiving accounts of his mercantile transactions, and in forwarding instructions to his *house*. And while the poor mind is thus kept at work, and the energies of the nervous system drained to supply the heavy expenditure caused by mental exertions—while care and its large family of attendant miseries are constantly expending the vital powers, is it reasonable to expect that health will be restored, even though the physical means employed with this view may be those best adapted to answer this intention? If any such means are to be fairly tried, the invalid must leave his cares at home, forego his customary occupations, divert his mind from its usual currents of thought, tear himself away for a while from his literary pursuits, detach himself from the excitements of political or private life, and leave the mind unshackled by its wonted ties, to enjoy, as it best may, its well-earned period of relaxation, and allow all the remaining energies of his nervous system to be concentrated on the work of restoring the bodily health.

It hardly need be said, that all the usual means of restoring a healthy state of the general system are to be attended to during the time that the Buxton waters are being made use of medicinally. We are fairly justified in ascribing their



want of influence on many cases, to the neglect of this important and reasonable direction. Regular hours for eating; simplicity in the diet; avoiding highly-seasoned dishes, and such as are rich or greasy; not eating of more than one or two dishes at any meal; being especially careful that the quantity eaten be no more than is necessary to satisfy the bodily wants; eating slowly, masticating every mouthful carefully, and mixing it intimately with the saliva; avoiding as much as is consistent with the individual case the stimulating products of fermentation; eating little or no supper; and going to bed early, and rising from it whenever the necessary quantity of sleep has been obtained; are among the more important of the directions that need be given as to these particulars.

But there are some of these matters, on which it may be well to say a few additional words. It is a common custom for the visitors at every hotel to dine together at a public table; and in many points of view it is a most excellent custom. There is no doubt that cheerful society has much effect on all the faculties and functions, that this is in many cases the best medicine that can be prescribed, and that among other good effects it is a great promoter of digestion. It is apt, however, to be attended with certain disadvantages, unless the individual has sufficient com-

mon sense to see that they are disadvantages, and sufficient self-control to act accordingly. There are numbers who lead most abstemious lives at their respective homes, who are induced, under the influence of a wish to do as others do, to take more or less of wine daily at the public table, to the manifest injury of their health, and with the no less manifest result of interfering very materially with the effect of these waters on their ailments. It cannot be too seriously urged, that even one or two glasses of wine, taken every day, by a person unused to its effects, and whose system is already suffering from disordered action, would interfere with the operation of any remedial means, and in all probability aggravate the existing malady.

In these days, the habitual use of wine may be said to be confined to a comparative few ; and it is seldom taken unless as an excuse for enjoying a lengthened conversation after dinner—as a sort of *ad libitum* accompaniment to the table-talk. Even under these circumstances, from accidental causes, or from the sad effects of sedentary habits, or from the thousand miseries entailed on the artificial life which is perhaps inseparable from civilised society, individuals become vietimised to diseases, and for their relief, they are taught to try this or that mode of treatment. Some of these are such as the Buxton

waters might be expected to relieve. An individual visits Buxton to make trial of their effects. Tempted by the various dishes that are placed before him, he is exceedingly apt to eat a greater variety of food, and a greater quantity of food, than he would have eaten at home, and to make use of wine daily, which he may have been altogether unused to do ; and the consequence is too apt to be a disturbed condition of the assimilating organs, and an excited state of the general system, which interfere with any effect that these waters might otherwise have had upon the case. When sufficient self-control in these particulars cannot be exercised, it will be better that the individual forego the advantages, which we have admitted to belong to cheerful society, than run the risk involved in what in such cases must be called excess.

This leads to the mention of a particular, which is perhaps sufficiently obvious, but which is not sufficiently attended to in practice. An invalid, prone, from the nature or degree of his ailments, or prone, constitutionally, to look on the darker side of things, leaves his family circle, and comes to Buxton a solitary being. His spirits suffer a very sensible depression ; he becomes peevish, fretful, and, in common language, *nervous*: the state of mind most likely to interfere with the action of any medicinal measure, how-

ever well it might be adapted to his bodily infirmity. Whenever circumstances enable the invalid to pursue a wiser course, one or more of the attached members of the family circle should always accompany him to a watering-place, or whenever he leaves his home in search of health. The influence of the mind upon the ailing body is greater than most people have an idea of, and the effect of the ailing body on the mind is no less great. I have seen men who have visited Buxton from great distances, who were naturally of strong mind, but in whom this poor dependent on the body's healthiness had been weakened by long-continued bodily suffering; who, separated from all those near and dear to them, have left Buxton no better, and perhaps worse, than they were when they came to it, and, as it has seemed to me, from this cause alone. I remember a case in which these facts were singularly exemplified. A gentleman of rank, having remarkable intellectual endowments, who had spent his life in acquiring knowledge, who had travelled much, and seen a great deal of what is called the world, and whose course of reading was of such a kind as to strengthen the mental powers, became invalided. He came to Buxton, by the advice of two medical friends of high eminence. He came alone, leaving his family at a distance of some two or three hundred miles. He speedily began



to suffer from depression of spirits, to a degree that was at first distressing, but which ultimately gave me much alarm. The case was one of those which are justly esteemed to be among those best suited to the effects of Buxton waters; and for the first week or two he sensibly improved under their use. But he was a man of refined moral sensibilities; his mental energies were enfeebled by long-continued indisposition; he felt the absence of all those to whose presence and attentions he was accustomed, and with whom he was connected by blood and by affection. His spirits became alarmingly depressed, his sleep disturbed and unrefreshing, his heart's action irregular; and he became, in fact, ill, from mental causes. He endeavoured to regain his control over his mind, he struggled manfully against what he knew to be hurtful to him, but in vain. He made up his mind to return home, and, almost at once, as if by magic, he recovered the same condition of mind and feeling he had enjoyed before his removal from home. This was undoubtedly an extreme case: so marked a case does not frequently occur. But there are thousands of cases which exhibit lesser degrees of the same thing; and it is a matter of much practical moment, and one that deserves to be attended to. All that can be done, to minister to the mind's comfort, secure its tranquillity, support and cheer it, is not only

useful in the treatment of any morbid state, but at times is essential to the success of such treatment.

It is so very generally the case that people eat more than is required to supply the expenditure of their bodies, that there is usually a degree of accumulation of alimentary matters in the system, and of excrementitious matters in the bowels. Under circumstances of disordered action in any of the organs or structures, in which the nervous influence is necessarily directed unduly to the affected part, and the blood diffused unequally through the different parts of the body, this loaded state of the principal passages usually occurs to a much greater degree. It is always well to relieve this condition, whatever mode of treatment may be necessary for the cure of the morbid state; and it is equally advisable to use, from time to time, such means as will obviate the recurrence of this to any great degree, during the progress of the treatment. And this is equally necessary in making use of the Buxton waters, whether as a bath, or internally. Let an individual be in whatsoever state he may, it is almost always advisable for him to take a few doses of aperient medicine for some days before entering on a course of these waters; and it is seldom the case that the dose is not very necessarily repeated several times during the first week or ten days.

It is, moreover, particularly important, inasmuch as these waters are necessarily stimulating in the first instance, to use every means to diminish the risk of their proving unduly stimulating. This may be done, in a great degree, by attention to the diet, &c. But this is seldom sufficient ; and there is no auxiliary means which proves so useful, or which may be trusted to with so much confidence, as keeping the bowels in a more relaxed state than would be considered to be either needful or desirable under other circumstances. The medicines best calculated to answer this end will necessarily vary with the nature of the case, and the peculiar constitution of the individual.

## CHAPTER X.

“ Their principal action is on the circulating and muscular systems, accelerating the motions of the former, and giving strength and tonicity to the latter. They are also very useful in morbidly-excited states of the nervous system, arising from debility, by whatever cause induced.”

DR. GAIRDNER.

WERE all the strata of the earth, which are found immediately around Buxton, uniformly present, a vertical section of the ground would present layers of grit, shale, limestone, toadstone, limestone, toadstone, and limestone, placed one above another. But this is not the case. By some convulsive effort, probably volcanic, some of the deeper strata have been heaved up to the surface, displacing the strata that had been originally above them. In this way, on the south side of the river Wye, limestone constitutes the uppermost stratum; and this river, where it passes under the crescent, may be said to bound the limestone formation. On the north side of the river, at this point, shale, a dark-brown indurated clay, forms the uppermost stratum; and, at a short distance up the hill on the Manchester road, this, in its turn, is covered by gritstone. According to Mr. Whitehurst, the gritstone is 120 yards in thickness, the shale 120 yards, the



first layer of limestone 50 yards, the first layer of toadstone 16 yards, the second layer of limestone 50 yards, the second layer of toadstone 46 yards, the third layer of limestone 60 yards ; and this appears to have been the greatest depth at which the position or thickness of the strata has been ascertained.

From the bed of shale, within a short distance of the northern bank of the river, there arises a spring, containing a weak impregnation of iron, which is of much value in a medicinal point of view. The erection of the crescent over the river Wye, and the formation of the high road at the back of the crescent, have so altered what must have been originally the aspect of things here, that this spring arises at the north side of the road, the river being thrown completely out of sight, as it here takes its course under the arches which form part of the foundation of the crescent.

The spring discharges itself into a stone basin, neatly arched over ; and as it has been made to issue from a sculptured lion's mouth, it is commonly known in the town as the 'lion's-mouth water.'

It is said to contain little more than half a grain of iron in the gallon. Its temperature is exceedingly variable, being dependent on the season of the year, and the prevailing temperature of the atmosphere ; from which it may be inferred, that this water is derived immediately from the atmo-

spheric waters, which percolate through the bed of shale, and so become impregnated with iron. The temperature of this water may be said to vary from 46 to 54 degrees. Its specific gravity is 1,0003. The iron is held in solution by carbonic acid; and as this escapes on exposure of the water to the air, the iron is precipitated, and the water loses its chalybeate properties.

It may be justly considered wonderful, that this water should be possessed of the medicinal powers, which experience leads us to attach to it. It is indeed singular, how small a proportion of some mineral substances will influence the system, when taken in the form of a mineral water. Certain it is, whatever might have been thought concerning the effects which this water would produce, that it acts as a mild and efficacious tonic. Tonic medicines are less used in the present day, than they ever were. Many cases of disordered health, which would, at one time, have been thought to be the result of debility, and treated accordingly, are now found to be the consequence of a very different condition of the body, and treated with success by means the most opposite. Debility is so very frequently simulated by an overloaded condition of the system, that there are few modes of treatment which require more care and judgment, than the administration of tonic medicines. It may be added to this, that, unless in cases

where the really debilitated state involves a rapid sinking of the powers of life, or is attended with much suffering to the individual—as in many neuralgic cases ; and, in fact, in all cases where the debility is dependent on chronic ailments, the tonic prescribed, if it be only capable of influencing the system at all, can hardly be too mild in its character, or too gradual in its effects. In such cases, the chalybeate water of Buxton may be confidently recommended, as possessing these advantages in a pre-eminent degree.

The ordinary dose is a pint every day, taken at twice. The first half of the daily dose may be taken about two hours after breakfast, the second from half an hour to two hours afterwards. But the quantity of this water which is taken daily must be made to depend on its effects ; and, in many cases, a much larger quantity than that now mentioned is to be advised.

It has been thought that the use of this water is not adapted to what may be called Buxton cases ; and if the tepid springs of Buxton were only calculated to benefit rheumatic or gouty cases, the idea would be in some degree correct. But even among cases of this kind, instances very frequently occur in which the use of the chalybeate water is of much service. But if what are called Buxton cases are to be considered as embracing the other kinds of disease in which the

tepid springs are found to be serviceable, such a conclusion, with reference to the use of the chalybeate water, is by no means justifiable. In many of the cases commonly benefited by the use of the tepid waters internally, and as a bath, the chalybeate water is used internally with the greatest advantage.

As an external application, this water has long been celebrated as an eye-water, and in many of the cases which have fallen under my observation, it has appeared to have more influence than the knowledge of its very weak chalybeate impregnation could have led me to expect. It is of more importance, however, to observe, that it has frequently been of much use as an application to indolent swellings of the joints. In such cases, the water has been poured from a spouted jug over the joint or joints affected, once or twice, or three times a day. It has appeared to stimulate the vessels of the part, and to promote absorption, to a much greater degree than has followed a similar application of cold water; and, in this point of view, it deserves attention.

From what has been observed as to the abuse of tonic medicines, it will be felt to be important that even so mild a tonic as this chalybeate has been proved to be, should not be used without a due degree of care, and that its effects be watched. It has been found to be sufficiently active to produce unpleasant symptoms when used incautiously.



## CHAPTER XI.

“ Ah ! what avail the largest gifts of Heaven,  
When drooping health and spirits go amiss?  
How tasteless then whatever can be given !  
Health is the vital principle of bliss.”

THOMSON.

IT might seem that a work of this nature should here find its natural termination, and that additional remarks must be either out of place or unnecessary. And were this work intended exclusively for the perusal of medical men, such a conclusion would not be very far from the correct one. But this is not the case ; and it seems advisable to do somewhat more than point out the general characters of the cases which may be considered as being likely to be benefited by the use of the Buxton waters. It may not be without its use, if some observations be made on a few of the diseases in which these waters are found to be most useful, and on various circumstances which should be taken into consideration in order to give these waters the best chance of doing good.

It should, however, be impressed on the mind of every invalid, that it is not because a man happens to be afflicted with this disease, or that disease, that any particular remedy is of necessity

suited to his individual case. For instance, one man may labour under rheumatism who would be cured by a medicine, which would necessarily make another sufferer from rheumatism infinitely worse, and perhaps prove in the latter case the indirect cause of death. The tissue affected by the disease, the situation of that tissue, the stage and the intensity of the disease, the original and the still remaining powers of the individual, the constitutional peculiarities, the habits of life, and numberless other matters, ought to be taken into account, before any remedy can be ordered with confidence, as being adapted to an individual case of any disease. The same observations hold good with reference to the use of these waters. They indicate the importance of using a remedy so powerful in its effects as the Buxton waters are admitted to be by all who have witnessed these effects, with no less judgment, and no less care, than would be considered necessary in making trial of any equally powerful remedy.

These observations are not made without a conviction that they are imperatively called for in such a work as this. It is a most prevalent notion, and it proves to be a most dangerous notion, that because a man who labours under the same disease as another man, or a disease similar to it in some of its features, is cured or relieved by a given mode of treatment, the same

mode of treatment must necessarily be equally applicable to the other case. The waters of Buxton are found to relieve hundreds and thousands of people from complaints that are as painful, and perhaps eventually as dangerous, as any to which man is liable. But numbers are little, if at all, benefited by their use, and to some their use proves decidedly and materially injurious. Why is this? Because the *name* of the disease engrosses the individual's undivided attention, while its stage, its degree, and other equally important features of the case, are overlooked or uncared for. Let the general effects of these waters be only understood; let them be prescribed in the states of system in which these effects may be reasonably expected to be beneficial; and the failures will dwindle into a most insignificant proportion of the cases submitted to their action; and the cases in which their use is followed by injurious consequences will be most few. Let these waters be used by people with the same rational views as medicines are prescribed by medical men, and their usefulness will be incalculably increased. What I would wish to impress on the reader's mind may be illustrated in a very few words, and the disease already made use of to explain my meaning will again serve my purpose. Rheumatism is so very different a disease under different

circumstances, that, although it may be said to be under all circumstances a disease of excitement, and although it presents the common character of affecting the same kind of tissue, and although all its varieties are connected together by a strong family likeness—presenting many of the same symptoms, so different a disease is it at different times, that at one time it is treated successfully by bloodletting and depletory measures, and injured by any other mode of treatment ; at another time it is injured by any of the antiphlogistic remedies, and relieved by strengthening remedies. It is evident enough, that, although the Buxton waters are found to influence rheumatism more than any other mode of treatment, in one of these states their use would be as hurtful, as in the other their use would be of service.

It remains, that the diseases, in which these waters have been found to be most useful, be briefly particularised ; and that the stage and degree of these diseases, in which a trial of them is not to be advised, be pointedly adverted to. It would be unnecessary, or out of place, to enter into any further account of these diseases, than will serve to show in which of their stages or modifications these waters may be expected to be useful.

Rheumatism deserves, on every account, to be mentioned first. It is the disease on which the



Buxton waters produce the most marked effects, if properly timed, and judiciously used. Rheumatism is modified in its characters, and in the treatment it requires, not only by the stage of the disease, and by its intensity, but by the tissues which are affected by it. It may be confined to the muscles of the trunk or extremities, or to the ligaments of the joints, or to the fibrous covering of the bones ; and the heart may or may not be involved in the disease. Rheumatism may be further subdivided, according to the degree of excitement which attends it, into acute, active, and chronic rheumatism.

Muscular rheumatism is, in general, influenced the most quickly by the use of these waters ; rheumatism, the seat of which is in the ligaments of the joints, is influenced less rapidly ; and the cases in which the longest perseverance in their use is required, are those in which the fibrous covering of the bones forms the seat of the disease. Exceptions to these remarks are occasionally met with ; but they will be found correct in a very large proportion of cases. The use of these waters, whether at the natural temperature, or heated artificially, is inadmissible in cases of acute rheumatism, until the febrile state has been relieved by appropriate treatment, and the disease has degenerated into the active, or the chronic state. It is in cases of this kind, that the waters

produce the most rapid effect. When depletory measures have been carried as far as they have been found to be necessary, when the febrile state has yielded to the treatment, when a new set of symptoms has arisen—fever having been succeeded by languor and irritability, and yet the rheumatism has baffled all the treatment that has been had recourse to,—to such cases as this, ten or twelve baths very generally afford entire relief, removing the pain, restoring the command over the limbs, and bringing back the energies of the system. The exceptions to this are few; and they can almost always be accounted for by some other disordered condition being mixed up with the cases.

In cases of active rheumatism, the use of these waters is by no means inadmissible; but they must be used with considerable caution, and the system should be put into as fit a state for making trial of them as can be done by attention, for a few weeks, to the diet, the state of the bowels, &c. A diet restricted, according to circumstances, both as to the quantity and the quality of the food taken; and a course of such aperient medicine as will freely emulge the abdominal organs, and even induce a slight sense of debility; constitute what I have generally found to be necessary, before making trial of these waters in such cases. It should be added, that, in cases of this kind, it is

usually advisable to begin the course of bathing, by taking two or more baths of the artificially heated waters, before venturing into the natural baths.

As might be expected, these waters have not so immediate an effect on chronic rheumatism. An opinion as to how rapidly these waters will influence cases of this kind, may be founded on a few very simple inquiries. When the disease has been of very long duration, the effects of these waters will be much more slowly manifested, than in more recent cases. When the disease has arisen from exposure to cold and wet, in persons of temperate habits, who have led active lives, it will be relieved more quickly, than when it has made its appearance more gradually, and without any very marked exciting cause, in persons who have led intemperate or luxurious lives, or whose occupations and habits have been sedentary. Age has likewise much influence in this respect. The older the person, the less immediate, and perhaps the less decided, will be the relief afforded.

It may be safely said, that those cases in which the effects of the waters are less readily induced, are those in which the artificially heated waters should be least trusted to. Indeed, in very few cases can their influence be relied upon as being more than temporary; whereas the effect of the natural baths is no less conspicuous in correcting the degree of predisposition to the disease, than it

is in removing it. But while this observation necessarily applies to synovial rheumatism (rheumatism of the joints), inasmuch as it is less readily influenced by the waters than muscular rheumatism, it is necessary that it should be borne in mind, that this kind of rheumatism is apt to be attended with more marked local excitement, although the accompanying constitutional excitement is often less considerable, and that this local excitement must be subdued by appropriate means before the natural baths can be used without risk. In most of these cases, the treatment must be commenced by the local application of leeches, blisters, and the like ; and a few baths of the artificially heated waters, as being necessarily less stimulating in their effects, should precede the use of the natural baths. All that is implied in the observation which led to these remarks is, that such cases are seldom efficiently relieved, if at all relieved, by the artificially heated baths, and that it is only from the natural baths that we can confidently look for real relief to the symptoms, or for anything more than temporary benefit.

Synovial rheumatism is in general a very obstinate disease, dependent on causes which have been a long time in operation, and rendering a very great alteration in the constitutional state necessary for its removal. Like the disease it is



so closely related to,—gout—it becomes more intractable on each successive attack. It need hardly be added, that in its gradual mode of attack, in the absence of severe constitutional disturbance, in the general character of the inflammatory action and of the pain, in the state of system in which it appears, and in many other points, we find sufficient data for distinguishing this disease from gout, which, at times, it so much resembles in external features. The effects of these waters on this kind of rheumatism, although requiring care in their exhibition, and a patient trial to be made of them, is sufficiently wonderful to make me consider, that this disease is only second to what is called muscular rheumatism, in the degree of relief afforded by the use of Buxton waters. In general, a second course of the baths, during the same season, as spoken of in an earlier part of this work, will be found to be of much service in the more obstinate cases of this nature.

The periosteal variety of rheumatism often requires the use of many hot baths, preparatory to an advantageous trial of the natural baths. For reasons connected with what is known to be a very common predisposing cause of this disease, appropriate medicinal treatment is commonly both a useful and necessary accompaniment of a course of these baths; and I cannot help observing, that although if not really necessary I avoid ordering

much mercury during the time that these waters are being used, I do not hesitate in such cases as these often are, or in cases where mercury would otherwise constitute a part of the prescription, to order it, stopping short of inducing salivation, with as little doubt as if the patient were not exposed to the effects of the baths. And as to prescribing an occasional dose, or very small alterative doses of mercury, where it seems to be indicated, I have uniformly done so, and without having seen reason to regret it in any one instance; and on the contrary with the fullest conviction, that such cases as those I am referring to would not have done so well, had this powerful medicine not been made to constitute an essential part of the treatment.

I would close these brief remarks on the effects of these waters on rheumatism in its various forms with one or two observations. One is what might be said of any disease to which the use of these waters is of service. It is, that I should have more reliance on the permanence of the relief afforded by the use of these waters, than I should have on the relief afforded by any other medicinal means. It is an observation which is confirmed by every day's observation, and which will be admitted by all who have seen much of Buxton practice. The other remark has more especial reference to the disease under immediate consider-

ation. It is of the utmost importance, that the condition of the heart's action be adequately ascertained, before submitting rheumatic patients to any mode of treatment, and even more especially before submitting these cases to the influence of Buxton waters. An important degree of disturbance may exist at this great centre of the circulating system without being suspected, unless it is borne in mind how intimately such a state is connected with rheumatism in all its forms, and without being ascertained unless an accurate examination has been made; and it need not be added how extremely unsafe would be the use of so powerfully stimulating a remedy as the baths of Buxton in such cases, without appropriate treatment had prepared the system for their effects. It may be added, that a state of the circulation may exist, and a character of the heart's action, which may simulate in most respects an oppressed condition of the system; but which a more careful examination, and a more cautious grouping of symptoms, may show to be dependent on a very different condition, and to be the result of an exhausted and enfeebled state. In such cases, I should look for much benefit from the cautious use of these waters. I make the remark from having observed the remarkable influence of these waters on states of system analogous to that in which the condition referred to originates.

Of all diseases, rheumatism alone excepted, gout is that over which Buxton waters possess most influence. A disease, the pathology of which is very imperfectly understood, which attacks people of almost all ages, and almost all classes of society but the very lowest,—and people of all temperaments and of the most opposite character, from the *bon-vivant* to the student, from the merchant to the statesman,—and people of very different habits of body, the spare and the fat; a disease to which the man who exercises his mind too much and his body too little is liable, to which the man who lives freely is liable; which passes from generation to generation with more certainty than the family estate, or any heir-loom; which may be palliated, but can seldom be cured, by any however decided plan of treatment; a disease which renders the duration of life peculiarly precarious, and which, if not kept in check, is sure to embitter the latter years of life with miserable decrepitude, and paroxysms of horrible suffering; a disease which is spreading more and more through our social system, and to which the number of victims is annually on the increase; gout is, of all diseases, that which is most distressing to those afflicted with it, and perhaps that which most baffles the efforts of medical men. For the relief of this disease, the waters of Buxton, when used with proper



precautions, are to be considered as being almost a specific. In the earlier stages of the disease, they seldom fail to remove it, and so far to correct the predisposition to it, that, with common care, it probably will not be felt again for years. In the more advanced stages of the disease, they almost always afford decided relief, and have more effect in lengthening the interval between the attacks, than any other mode of treatment.

But to effect this great amount of good, these waters must be used under proper circumstances, and with proper precautions. Gout has been divided into tonic and atonic gout, into gout attended with a full and excited habit of body, and gout accompanied with a sluggish state of system. Individual cases partake more or less of one or other of these characters, and require a corresponding kind and degree of preparatory treatment, before the Buxton waters can be used with the certainty of benefit.

The cases of gout in which these waters produce the most marked and rapid effects, are those in which the powers of the system have been much enfeebled by the effects of the disease and of the treatment it has required, where the constitutional energies are exhausted by the struggle, and the disease triumphs over the debilitated frame. The change produced by these waters in such cases as these, is often too rapid and too

great to be believed by any who have not witnessed it. The more nearly the individual's state approaches to the condition now described, the more decidedly and rapidly may the effects of these waters be expected to be induced. In cases where a certain degree of gouty excitement is present, these waters should be made use of most cautiously ; and some accompanying medicinal treatment will generally be found to be useful, if not necessary. Where there is much gouty excitement, these waters should not be used ; or rather the course should not be commenced, or if commenced it should be intermitted, until this state has been in some degree subdued, and then the use of the waters must be commenced and proceeded with in the most careful way.

There is a large class of cases in which people suffer from what is called irregular gout ; where the symptoms sufficiently mark to an observant practitioner the nature of the disease, but where no treatment seems to be of essential service, and the patient suffers much and long, until some accidental circumstance induces a decided fit of gout ; or this miserable state ends in the supervention of a seriously disordered state of system, resolving the case into one of ordinary but dangerous illness. I am far from agreeing with what is a favourite notion with many, that an attack of gout is really useful to an individual, and that it should rather

be wished for than otherwise, as a means of warding off other, and *so called*, more serious diseases. But in such cases as those referred to, where ordinary treatment produces little effect in relieving the symptoms, a decided fit of gout must needs be regarded as the greatest boon to be hoped for ; and the use of the Buxton baths may be confidently recommended as the means most likely to effect this object.

Gouty swellings \* may consist of soft gelatinous deposition, or of this mixed with chalk, or of what may be more emphatically called *chalk stones*. In promoting the absorption of the first of these, the effect of these waters is singularly great ; in promoting the absorption of the second of these, they have considerable influence ; over the third, which however are almost confined to the more severe and long continued cases, neither these waters, nor any other means, appear to have any influence.

As a means of restoring energy to those whose systems have been much shattered by gout ; as a means of inducing gout in cases where this is desirable ; as a means of relieving the disease in all but its inflammatory stage ; as a means of warding off the fits, and prolonging the interval

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\* Of course I mean the swellings which remain after the inflammatory action has subsided, and which increase on every successive attack of the disease.

between them ; Buxton waters deserve to be regarded as among the most powerful we possess.

There is a species of paralysis which may be called muscular paralysis, which cannot be connected with cerebral disease, which often attends or is consequent upon rheumatic attacks, which is usually induced by exposure to cold and wet, which often attacks young people during the period of growth, to which the use of these waters is of much service, and which is very generally cured by their use. In cases of paralysis, which are the results of local injury, and which do not seem to depend on structural changes in the great centre of the nervous system, these waters generally prove useful. In those cases in which the brain or the spinal marrow is the seat of the disease, a trial of these waters is very rarely, if ever advisable.

There is a large class of cases of seriously impaired health, resulting from the excessive use, or the abuse, of mercury. These cases may, or may not, present the characters of rheumatism, or of partial paralysis. The nervous energies are greatly enfeebled, and the functions of the assimilating organs inadequately performed. It may be called the mercurial disease ; and many are the forms in which it shows itself. It is a disease which often proves singularly intractable to ordinary medical treatment. The Buxton baths are of great service in a large majority of these cases.



It may be questioned how far we are justified in considering neuralgia to be a distinct affection, with reference to the effect of these waters, or of any other single mode of treatment upon the disease ; so much does it vary in cause, nature, and degree, and so different is the treatment required by the different forms of the disease. There is a form of this disease which is produced by the same exciting causes as rheumatism, such as exposure to cold, and the like, and which seems to be little else than a peculiar variety of rheumatism, in which the use of these waters is almost invariably beneficial, when properly timed and judiciously tried. When neuralgia is unattended with inflammatory action, when tonics have been tried and found to be inefficient for its relief, and when the digestive organs have been attended to, and any morbid state of the abdominal secretions corrected by suitable aperients, the use of these waters is often found to afford speedy and great relief ; and, as in most other cases, when their use is attended with benefit, the benefit is usually of singularly long duration. In many of these cases, when the system is evidently suffering from great debility, or where there is much of an irritable condition present, the use of several baths of the artificially heated waters is necessary before the natural baths are made use of ; and in many cases of this kind, the use of the natural baths is posi-

tively injurious, when the hotter baths are found to afford effectual relief. Neuralgia, in its more obstinate forms, when it has continued for a very considerable time, and more particularly when it occurs in persons who are somewhat advanced in life, often depends on organic changes. In such cases, neither these waters nor any other plan of treatment can be expected to afford either satisfactory or permanent relief. In the less obstinate and more recent cases of the disease, which occur in young people, and are connected with an irritable state of the spinal nerves, the use of these waters is usually attended with the most immediate, and marked, and satisfactory results.

And this leads to the mention of the extraordinary effects produced by these baths in what are called *spinal cases*, cases of morbid sensibility of the spine, with or without curvature of the spinal column, consequent upon a debilitated state of the general system, and which do not appear to involve organic changes in the spinal marrow. The relief of pain, the diminishing of morbid sensibility, the improvement of the digestive functions, and the restoration of the powers of the system, are so remarkable, as to lead me to consider their influence on this class of cases to be one of the most pleasing features in an estimate of their medical properties. It may be added, that in most of the diseases which are consequent on a debilitated

habit of body, when organic changes have not taken place, the use of these baths will be found to do much good. And, indeed, proved as they have been to act as a powerful and general stimulant, this effect might have been looked forward to in such cases. The importance of ascertaining that inflammatory action either has not been set up, or has been subdued, before these stimulating means be had recourse to, need hardly be enforced after all that has been said of the medical properties of the Buxton waters.

It is only too well known that scrofula, using the word in its most extended sense, and conceiving it to embrace all the forms in which it presents itself, is greatly on the increase among us ; and this is perhaps, in some degree, only a necessary consequence of our deservedly boasted civilisation, and highly valued commercial importance. The confinement of a very large proportion of the population to the impure air of towns and factories, the neglect of exercise, the defectively nutritious food used by some classes of the people, and the pampered diet of other classes, the sad abuse of stimulating liquors, and the undue wear and tear of mind, all contribute their share in the production of the lamentable result, and cause every succeeding generation to be less necessarily healthy—rendering attention to the means of promoting and maintaining health more necessarily

incumbent on every generation, than was found to be necessary to the healthiness of the generation immediately preceding it. In this point of view, the general effects of these waters on scrofulous cases, or cases dependent on a debilitated condition of system, will be admitted to be singularly interesting.

In the dyspepsia, which supervenes on such a state of system as that now referred to, whether the consequence of fashionable dissipation and the real debility which so often attends it, or of deficient and little nourishing food in a very different class of society, or produced by any other similarly acting cause, the internal use of the Buxton waters is often found to be of much service, and their external use very frequently does much good. In the dyspepsia which is so much more commonly met with, which depends on an overloaded condition of system, and an excited state of the digestive organs, and which is only to be relieved by abstemiousness, aperient medicines, exercise, and change of air, Buxton can only be useful in the last named particular, and its waters should not be used in any way.



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